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HARPER'S PICTURE BOOKS FOR THE NURSERY.

Learning to Talk.

Learning to Think.

Learning to Read.

Learning about Common Things.

Learning about Right and Wrong.

BY JACOB ABBOTT.

In Five Volumes, each Volume Complete in Itself.

Entered, according to Act of Congress, in the year one thousand eight hundred
and fifty-four, by

HARPER & BROTHERS,

in the Clerk's Office of the District Court of the Southern District of New York.

THE LITTLE LEARNER.

LEARNING ABOUT COMMON THINGS;

OR,

FAMILIAR INSTRUCTIONS FOR CHILDREN IN RESPECT TO THE OBJECTS AROUND THEM, THAT ATTRACT THEIR ATTENTION,
AND AWAKEN THEIR CURIOSITY, IN THE
EARLIEST YEARS OF LIFE.

BY JACOB ABBOTT.

ILLUSTRATED WITH ONE HUNDRED AND TWENTY ENGRAVINGS.



NEW YORK:

HARPER & BROTHERS, PUBLISHERS,

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1857.

Entered, according to Act of Congress, in the year one thousand eight hundred
and fifty-six, by

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DIRECTIONS.

THIS book, like the other volumes of the series, is intended, in a great measure, for children that have not yet learned to read fluently enough to understand and enjoy reading by themselves. Of course, in such cases, the book is to be read to the child by a parent, a brother or sister, or other friend, as a book of instruction. The following directions will be of aid to those thus using the book:

1. Read very slowly and deliberately. Pause after each question, to allow the child time to give an answer to it, if he is able to answer it; and if not, to awaken his curiosity in respect to the answer, so as to prepare him to receive it with an *appetite*, as it were.

2. Always *make the best* of any answers which the child may venture to give to the questions of his own accord; that is, interpret them favorably, and treat them in an indulgent manner, explaining the mistakes, and the infantile errors which may be involved in them, in a gentle and encouraging way, so as to draw out the thoughts and ideas of the child more and more fully, instead of repressing his communicativeness by appearing to consider his conceptions and opinions foolish or absurd.

3. Encourage the child to ask as many additional questions as he pleases in respect to the subjects introduced, or to the engravings illustrating them, and make many additional explanations.

Whenever the subject of the questions is any object that is at hand, and can be examined, the attention of the child should be especially directed to it, and time allowed for the full examination of it, and for the complete verification of whatever may be said about it in the book.

4. It is better that but a small portion of the book should be read to the pupil at a time, so that each successive portion that is read may be thoroughly understood and fully appreciated before passing on to what follows.

5. Where the child is old enough to read the book himself, it will be excellent practice for him to read it aloud, a lesson at a time, in the hearing of his mother, or of an older sister, while she is sitting at her work. In such a case as this, the reader must be instructed to proceed very slowly, and always, after reading a question, to answer it as well as he can himself, before reading the answer contained in the book.

6. Another excellent mode of using the book, where there are two children of different ages in the family, and one of them is old enough to read, is this. Let the older child read the questions and show the pictures to the younger one, leaving the latter to answer the questions so far as he can. The exercise will thus be a lesson in reading to the one, and one of instruction to both. The mother may sit by all the while, listening to the exercise, and taking the general direction of it, while she still goes on with her work, or pursues any of her household avocations. Thus she is instructing and entertaining two of her children, and is, at the same time, not interrupted or taken off from her other employments. A mother who really takes an interest in personally promoting the development of

the minds of her children, will find the exercise, thus conducted, a very agreeable as well as a very careful mode of spending a half hour with them two or three times a day. It is best, however, in such cases, to make the exercises short. One lesson at a time, thoroughly read and considered, is quite enough.

The author hopes that this book, like its predecessor, **LEARNING TO THINK**, will prove of great value to the mother as well as to the child, by opening to her view, through his answers to the questions, and his observations and reasonings in respect to them, a more full exhibition of the workings of the infantile mind—of the extent of its powers, the state of its knowledge, and the general character of its conceptions and ideas, and thus greatly facilitate her efforts in instructing and training it.

COMMON THINGS.

DIVISION I. SUBSTANCES.

I. SHAPE.

SUPPOSE you were to spread out a handkerchief upon the floor, so as to see all the sides of it, how many sides would there be to see? How many corners?

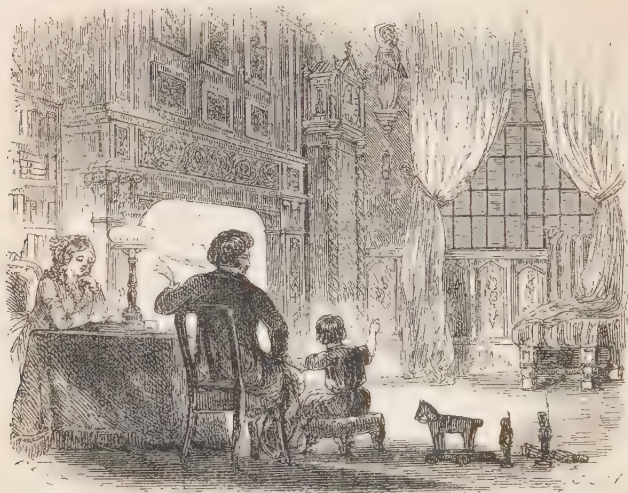
Would the sides of the handkerchief be straight or crooked? Suppose you were to drop a thread upon the floor, would it lie straight or crooked? Would you like to try it?

What is the shape of a handkerchief when it lies spread out upon the floor? It is square. How many corners has a square thing? How many sides? Are the corners of a square thing all alike? Are the sides all alike? Is a square thing as long one way as it is the other way?

Suppose a thing that has square corners is longer one way than it is the other way, what shape do we call it? Oblong.

Has this book got square corners? Is it longer one way than it is the other way? Yes, a little. What shape is it, then? It is a little oblong. Are books generally square or oblong? Are they generally more or less oblong than this book is? What is

the shape of a pane of glass? Do you see the panes of glass that the child is looking at in this picture? Are they square or ob-



long? Do you see that the panes are longer up and down than they are from side to side?

How many corners has a book? How many has a table? How many has the carpet?

Has every thing four corners? If you had a sheet of paper and a pair of scissors, do you think you could cut out a piece of the paper with four corners? Do you think you could cut out a piece with three corners?

Do you think you could cut out a piece with no corners at all?

What shape is a ring? When is any thing round? When the

distance from the middle of it out to the border of it is the same every where.

Is a book round? Why not? Because it has got corners, and it is farther from the middle of it out to one of the corners, than it is to the middle of a side.

What else is round like a ring? A hoop is round like a ring, and so is a wheel. Is a silver dollar round like a ring? Yes, the border of it is round like a ring, only it is not open like a ring in the middle. Can you think of any thing else that is round like a ring or a dollar? A plate, a cent, the top of a cup, and the letter o.

Look at the picture on the other page, and see if you can see any thing in it that is round. Can you see any thing in it that is square? See if you can find any thing that has corners in the picture.

Do you think that is a pretty room? I think it is a very pretty room indeed. What a bright fire! There is a lady sitting at a table. She is reading by the light of a lamp. See the playthings on the floor. What are the playthings? Who do you think the playthings belong to?

Is there any thing in the picture that is *rounded*? The corners of the fire-place are rounded. So is the glass shade over the lamp. What does rounded mean? It means made like a round, in part. Don't you see how the corners of the fire-place are rounded?

See if you can find any thing in this room, where we are, that is round. See if you can find any thing that is rounded.

What shape is a roller? Is it round like a ring? No, it is *long and round*.

Do you see this picture of a roller, which the man is drawing



over the ground? Do you know what he is drawing it over the ground for? It is to roll down the ground hard and make a good path. This roller is made of stone, and it is very heavy. It presses very heavily upon the ground, as the man draws it along, and so rolls the earth smooth and hard, and makes it good walking.

Is the roller itself round like a ring? Is the end of it round like a ring?

Is the leg of a chair round? Is it round like a ring, or like a roller?

Is a tumbler round? Is it like a ring or a roller? What else can you think of that is round like a roller? A pencil, a cane, an arm, a finger, a log.

What shape is a ball? Round. Is it round like a ring? Is it round like a roller? No; it is round every way.

Is an orange round? Is it round like a ring, or a roller, or ball. Is a phial round? Like what? Is an apple round? Like what? Is a pail round? Like what?

Is the sun round? Yes. It looks round and flat; but it is really round like a ball. So is the moon.

Could any body cut a piece of paper round? Would it be round like a piece of money, or like a ball, or like a roller? Could you make any thing of paper that would be round like a roller? You could roll up the paper. Could you make any thing of paper round like a ball?

If you make a round mark upon the slate, would it be round like a ring, or like a roller, or like a ball?

Are all rings of the same shape? Are they all of the same size?

Are all rollers of the same shape? No, a pencil is long, and not large round; but a tumbler is very large round.

Is a barrel round like a roller? Not exactly. Why? It swells out in the middle. Is the limb of a tree round like a roller? Not exactly. Why? It grows smaller and smaller toward the end.

Are all balls of the same shape? Yes, only some are bigger than others.

Is an egg round like a ball? Not exactly; it is longer from one end to the other than it is across.

II. COLOR.

DID you ever observe how many different colors there are? How many different colors can you think of?

What color is the sky? What color is the grass? A wafer? Brass? Ink?

What good does it do to have things of different colors? Many things look prettier.

Which do you think is the prettiest color, green or blue? Which do you think is the prettiest, red or white? Which do you think is the prettiest, yellow or green?

When is a thing striped? When it has different colors in long lines. See if you can find any thing in this room that is striped.

What is a spot? It is a little place upon something of a different color from the rest. See if you can find any thing that is spotted.

What color is paper? What color is ink? Why is the ink black and the paper white? So that marks made with ink upon paper may be seen plainly.

What color is the slate? What color is the pencil mark? Why is it necessary to have the marks that we make on a slate white?

Suppose you were going to mark upon a white wall, would it be best to mark with a coal or with chalk? Suppose the wall was black, which would be best?

What color is snow? What color is grass? What color are the fields in winter? In summer? What colors are the flowers?

Did you ever see a rainbow?



Here is a picture of a child looking at a rainbow. Do you see the rainbow in the sky? Do you know what makes a rainbow? It is the sun shining on millions of bright little drops of rain in the sky.

What advantage is there in having the fields green in summer? Green is a very pretty color to see.

Suppose the grass were red, what harm would there be in it? The bright sun in the summer would shine upon it so as to make it dazzle our eyes.

Does not the sun shine upon the snow in winter? Does it dazzle our eyes? Yes.

Why, then, did God make the snow white? Perhaps because white snow makes it lighter in the night.

Why should not the fields be covered with something white in summer too? Perhaps because the nights are not so long, and there is not so much danger if it is dark.

What, then, would be the harm if the fields were of any bright color in summer? Our eyes would always be dazzled.

What would be the harm if the fields were of any dark color in winter? It would be very dark and gloomy in the night, and persons would often be lost in the snow and frozen.

What color is fire? Very bright—yellow and red. What good does it do for the fire to be of a very bright color? It gives us light in the night.

Is it any safer to use fire on account of its being very bright? Yes; if any thing takes fire, it makes a great light, and people see it sooner.

What color is water? It has no color. Is not water white? No. Milk is white, and milk is very different from water.

What kind of things are there in nature that have the brightest colors? The things that are seen but seldom, or that last but a short time.

What things are there in nature that are seen seldom which have bright colors? Some birds in the woods, especially in countries where there are but few men. What things are there in nature that last but a short time which have bright colors? The rainbow and flowers.

Why is it that only such things as are seldom seen, or that last but a short time, have bright colors? Because we soon get tired of bright and gay colors, though they are very pretty at first.

III. HARDNESS AND SOFTNESS.

CAN you think of any thing that is hard? Can you think of any thing that is soft? Tell me as many things as you can think of that are hard. Tell me as many things as you can think of that are soft.

What do you mean by saying that a thing is soft? It yields when we push against it. What do we mean when we say it is hard? That it does not yield when we push against it.

Feel of the table, and tell me whether it is hard or soft. Does it yield when we push against it?

Feel of your cheek, and tell me whether it is hard or soft. Does it yield when you push against it? Is a cushion hard or soft? Why is a cushion made soft?

What part of the body is the hardest? The teeth. Why is it necessary that the teeth should be hard?

Why is the table made of something hard? So that it may not bend and let the things fall off.

Is a pin-cushion hard or soft? Why is it necessary that a pin-cushion should be soft? Do you know what people put into the inside of a pin-cushion to make it soft, so that the pins will go in?

Is a bedstead made of something hard or soft? Is a bed made of something hard or soft? Why is the bed made of something soft, and the bedstead of something hard? The bedstead must be stiff and hard to keep up the bed, and the bed must be soft so as to be easy to sleep upon.



Here is the picture of a bed, with a boy lying in it. Don't you see how soft it looks? The boy looks very comfortable, lying in such a nice bed.

Do you see the bedstead? Do you see the table and the lamp? What a pleasant room it is! Don't you think it is a pleasant room?

The gentleman is reading the boy a story. Do you see the book? I think the boy has been sick, and is now getting better, and the gentleman is reading him a story. I see a good many more books in the room; do you see them?

Do you think it is summer or winter here? Why? Do you think it is night or day? Why?

Which is the hardest, an apple or a piece of wood? How do

you know? Because I can cut the apple much easier than I can the wood. Which is the softest, a pillow or the back of a cat?

Suppose you strike two hard things together, what do you observe? They make a noise. Suppose you strike two soft things together, do they make a noise? How can you try it? With two balls of yarn.

Are your fingers soft or hard? There is something hard in the middle of them, but they are soft outside. Suppose they were hard, what would be the harm? They would rattle together when I moved them.

What parts of your body are hard? My teeth and my nails. Why did God make your teeth hard? So that I can bite things with them. Why did God make your nails hard? So that I can point better, and take up little things with them.

Which is hardest, the shell of a walnut or the meat? How do you know? Because I can bite the meat, but can not bite the shell. Which is the hardest, the shell of a walnut or the shell of a chestnut? How do you know?

Which is the hardest, wood or stone? How do you know? I can cut or break the wood more easily than I can the stone.

What are knife-blades made of? Steel. Why are they made of steel? Because steel is very hard, and will cut through a great many other things.

What do we mean when we say a thing is stiff? We mean it will not bend. What should we say if it will bend? We should say it was limber. Is a pole limber? A string? The trunk of a tree? The small branches? What part of a whip is stiff? What part is limber?

IV. WEIGHT.

WHEN you throw a stone in the air, does it stay there? What becomes of it? Which way is down? Toward the ground.

Does every thing come down as far as it can toward the ground? Suppose you drop a feather, does it come down toward the ground? Yes, slowly. What do we mean when we say that any thing is heavy? It is hard to lift it. When any thing is not hard to be lifted, what do we say of it? It is light. Does light ever mean any thing else? What? It sometimes means not dark.

Suppose I were to say that the moon shone and made it light, should I mean not heavy or not dark? Suppose I were to say that the farmer's load, when he went to market, was very light, what should I mean then?



Which would be the easiest to move, a great stone, or a piece of wood as big as the stone? When people wish to move a big stone, what do they do? They bring great iron bars to pry it up with, and oxen to haul it away. Here you see them doing it.

Do you see the oxen? Do you see the great stone, and the men prying it up? Do you see what they are going to put it on to draw it away?

They are going to put it on a drag. That is the drag in the corner of the picture. It is made of plank. It has no wheels. It lies flat upon the ground. Why does not it have wheels? Because the wheels would raise it up above the ground so high that it would be very difficult to get that great heavy stone up to the top of it. But now, when they have pried up the stone a little way, they will block it up there, and then they will put the drag under the edge of the stone, and so roll the stone over upon it. Then they will fasten the oxen to the drag, and the oxen will draw it away.

Suppose you put a stone in the water, what becomes of it? It sinks to the bottom. Why does it sink to the bottom? Because it is heavier than the water, and so it presses down through it.

Suppose you put a piece of wood in the water, what becomes of it? It floats upon the top of the water. Why? Because the water is heavier than the wood, and it presses down under it and so keeps it up.

Which is heaviest, ice or water? How do you know?

Why did God make things to be heavy? So that they may be kept down firmly where they are put. Suppose they had no weight, what would be the harm? Every thing would be easily moved and blown about, as feathers are, which have but little weight.

Which is the heaviest, glass or ice? Will an axe sink or float in water? Why will it sink? Because there is so much iron in it. Suppose you put a board in the water, and then put a little stone on it, will it sink? Perhaps not, if the stone is small. Suppose you put many stones upon it, will it then sink?

How soon will it sink? It will sink as soon as we have put so

many stones upon it as to make the stones and the board together heavier than the water.

Which is the heaviest, a bullet or a log of wood? Which will sink in the water? Why will not the log sink if it is heavier than the bullet? Because it is a great deal larger, and there is more water under it to keep it up.

What things are made heavy on purpose? A flat-iron. Why? A pestle. Why? A hammer. Why?

What is made light on purpose? A kite. Why? A basket. Why?

V. LIGHT.

Is it always light? Is it always dark? When is it dark? Why is it light in the day and dark in the night? Because the sun shines in the day.

Is it always very dark in the night? Why not? What shines in the night besides the moon?

Who made the sun, and the moon, and the stars? Why did he make the world so as to be dark part of the time? Because we must sleep part of the time, and it is easier to sleep when it is dark.

Can we always see the sun in the sky in the daytime? No, because it is sometimes cloudy. Why can not we see the sun when it is cloudy? Because the clouds come between us and the sun, and hide it.

Did you ever see the clouds moving in the sky? Do they move fast or slow? Sometimes they move fast and sometimes slow.

Do the clouds ever hide the moon too? Here is a picture of the moon, with the clouds coming over it to hide it. Do you see the moon? Do you see the clouds? Do you see the man and the dog? The man is taking a walk in the moonlight, and the dog is going with him to keep him company. Don't you think it is rather a lonely place?



Do you see the shadow of the man on the ground? What makes the shadow? The moon. How does the moon make the shadow of a man on the ground? It shines on all the ground ex-

cept behind the man, and that makes a dark place on the ground just the shape of a man.

Is the moon entirely hidden by the clouds in the picture? Is it partly hidden? Is the sun ever entirely hidden by the clouds? Is it always dark then? No, it is not very dark. Why is it not quite dark when the sun is wholly hidden? Because a good deal of light shines *through* the clouds.

Is it always dark in the house when the sun and the moon do not shine? How do we make it light in the house? By a little bright fire made with a lamp or a candle. Sometimes the light is made by gas.

How does the light get into the room in the daytime? It shines in through the windows. Why is it dark in a closet?

Why does not the light from the lamp shine out through the windows in the night, and make it light out of doors? Because the light of such a small thing as a lamp is not large enough or bright enough for that.

Can light shine through a board? Can it shine through water? What is any thing called when the light can shine through it? Transparent. What else can we think of besides water that is transparent? Glass.

Suppose God had made every thing transparent, what would have been the harm? People could look through the sides of the house, and see every body in it.

Suppose God had made nothing transparent, what would have been the harm? We should have had nothing to make windows of.

Could not we have left an open place for the light to come in? Yes, but then the wind and the rain would come in too.

Why is it very dark in the night when it is cloudy? Because there is not light enough from the moon and stars to shine through the clouds. Which gives the most light then, the sun or the moon?

Does any thing else give light besides the sun, moon, stars, and fire? Yes, the lightning. Where does the lightning shine? In the clouds.

Did you ever see it lighten? Are you afraid when it lightens? Are you afraid when the sun shines?

VI. FIRE.

WHEN you put a piece of wood upon the fire, what becomes of it? It burns up.

What is it changed into? Some of it is changed into smoke, and goes up the chimney, and some of it is changed into coals and ashes, which stay in the fire-place.

Will every thing burn? Will bricks burn? How do you know that bricks will not burn?

Will paper burn? Tell me all the things you can think of that will burn. Now tell me all the things you can think of that will not burn.

Which burns fastest, paper or wood?

Which burns longest? Which makes the greatest blaze? Will cloth burn? Will your clothes burn? Will oil burn? How do you know? Will water burn? Do we use water about the fire? What for?

Why do we have a fire?

Is it always necessary to have a fire to warm us? When do we not have a fire? In summer. Why do we not have a fire in summer as well as in winter?

What else does fire make besides heat? Light. Do we burn wood or coal in the fire-place for the heat or for the light? Do we burn lamps and candles for the heat or for the light?

What would have been the harm if God had made every thing so that it would burn? Then we could not keep the fire by itself.

It would have spread from one thing to another, and every thing would be burned up.

What is it that keeps the fire in houses by itself, and prevents its burning the house? The bricks of the hearth, and the chimney, and the iron of the grate, if there is a grate. Do houses ever take fire? Yes, and blaze up very high and burn to ashes, with every thing that is in them. Is it right for children to play with fire?

What is this a picture of? A house on fire. Do you see the flames and the smoke bursting out through some of the windows and shining out through the roof? We can see the timbers of the roof. The boards are burned away, and so we can see the timbers. Those are the rafters of the house. The slanting timbers of a roof are called rafters.



Do you see the ladders leaning up against the house? How many ladders can you see? We can see two. There are men going up the ladders.

What do you think they are going up for? There is a long ladder and a short ladder. The man on the long ladder has got the hose from the fire-engine to put out the fire with.

Do you know what the hose from a fire-engine is? It is a long leather thing about as large round as a man's arm, and hollow in the middle, so that water can flow through it. Don't you see the hose in the picture, coming up from the fire-engine, along by the side of the ladder?

I hope the people have all got out of this house, for if there are any in it they will be burned to death.

What becomes of the smoke which rises from a fire? It floats about in the air, and some part of it goes into the leaves of trees, and is carried down the little branches, and helps to make wood again.

What becomes of the ashes? It is thrown out at last on the ground, and some part of it goes into the leaves of trees, and goes up the trunk, and helps to make wood again.

What good does it do to us to have oil made so that it will burn? What good does it do to us to have water made so that it will not burn?

Would it have been as well if God had made the water so that it would burn, and oil so that it would not burn? No, because we want something much more plentiful to put out fires with than to burn in lamps, and water is more plentiful than oil.

Would it not have been as well to have had iron burn and wood not burn? No, because we want more material for building fires than for grates, and shovels, and tongs, and wood is more plentiful than iron.

Would it be as well to have sand, clay, and other parts of the ground burn, and wood not burn? No, because then the ground might take fire, and we could not put it out, and the whole world would be burned up.

Will grass burn? No, not while it is green.

Will the ground burn any where? No, not exactly; but there are places in the world, among the mountains, where the fire some-

times bursts up out of the ground very high, and throws out smoke, and flames, and hot stones, and melted matter.

What are these burning mountains called? They are called volcanoes. Here is a picture of a volcano. Do you see the mount-



ains? Do you see the flames bursting out? Do you see the stones flying through the air?

There are some people in a boat. What are they doing? They are looking at the volcano. They are holding out their arms to point at the volcano. I think they are afraid. What a terrible spectacle it is! Sometimes the hot ashes and the hot stones fall upon the houses and burn them up.

There are some places in the world where hot water bursts up

out of the ground instead of flames, and smoke, and melted matter. Here is a picture of one of these places. In the middle of the picture we see the water bursting up. See how high it is thrown



up into the air! There are some persons there that have come to look at it. How much higher than their heads the water is thrown up!

The water goes up with great force. It carries stones up with it. I can see some stones in the water. Can you see them?

The water is boiling hot. It is so hot that it is not safe to go near it. Don't you see it smoking?

I suppose the water is heated by fires down deep under the ground—such fires as burst out in volcanoes. There are generally volcanoes near these boiling springs. There is one in the picture. Do you see it?

This volcano and boiling spring are near the sea. Do you see the sea in the picture?

Almost all volcanoes are near the sea. This is curious. Can you think of any reason why they should always be near the sea? *I* can not.

VII. WATER.

HAS water any color? Has it any taste? Has it any smell? Is it heavy?

Where does water come from? From wells and springs, from brooks and rivers, and from the skies when it rains.

Does it ever become hard and solid? What makes it become hard and solid? The cold. What is it called when it becomes so? It is called ice.

Suppose you put some ice in a warm place, what would become of it? What does it turn into?

Suppose you put some water over the fire, what becomes of it? It boils, and the quantity grows less and less, until at last it all

boils away. What does it turn into? Steam. What becomes of the steam? It goes off up the chimney into the air, and is spread all about. Why do we not see it? Because it is too thin.

What are the clouds? They are this water, which has gathered again in the air so that we can see it.

Is water transparent? What benefit is it to us to have water transparent? We can see how deep it is, and we can also see whether there is any thing in it when we drink it.

Is water very plentiful or not very plentiful? Mention some things that water is good for.

When is a thing said to be wet? When there is a little water upon it or in it. When is any thing said to be dry? When the water has all gone away.

If you hold any thing wet to the fire, what change takes place? It dries. What becomes of the water? It goes off into the air.

Suppose you lay something that is wet away from the fire, will it dry then? Will it dry as fast as it did before? Suppose you put it in the sun, will it dry faster or not as fast as before?

Why can we not see the water when it goes off into the air? Because it goes off very slowly and in very small particles. Can we ever see it going off? Yes, when water is heated over the fire, we can sometimes see the vapor going off.

Suppose water stands in a bowl, would it go off slowly into the air? Yes; we could prove this by putting a little water in a cup, or saucer, or bowl, and leaving it for some days, and then, at the end of the few days, if we were to go and look at it, we should find the water all gone.

Does the water rise up in this way from rivers, and brooks, and

the sea? Yes. What becomes of it? It is spread through the air all around us and over our heads.

Why does it not wet us? Because it is so thin. Can we ever see it? Yes. It sometimes gathers into clouds, and then we can see it.

Does the water ever come down again after it has once gone up? Yes; when it rains, it is this water which has gone up, and is now coming down again to the ground, that makes the rain.

What becomes of the water when it reaches the ground? It runs down the sides of the hills, and forms little brooks, and a great many brooks run together and form rivers, and the rivers run into the sea.

Sometimes the river, in flowing toward the sea, comes to a steep place over rocks, and then the water pours down and makes a waterfall.

Did you ever see a brook? Did you observe the water running along in it? Did you see the stones and the sand on the bottom of it?

Does grass grow on the banks of a brook? Does grass grow in the bottom of a brook? No, not when the water runs fast. Sometimes green things like grass grow where the water is still.

What is the reason that grass does not grow in the bottom of a brook? Because it can not grow under water.

How do people get over brooks and rivers? They go over on a bridge if it is a brook, and if it is a large river sometimes they go over in a boat.

Does the water run in the brooks and rivers all the time? Yes, it runs all the time.

Here is a picture of a waterfall. Do you not see the water pour-



ing down over that steep, rocky place? There is a boat on the water below, with four men in it. There are clouds of spray rising up at the foot of the fall.

Does all the water that comes down in the rain run into brooks and rivers? No. Some of it soaks into the ground, and into the wells and springs.

Which is the lightest, ice or water? How do you know that ice is lightest? Because it floats upon the water.

What would be the harm if ice were heavier than water? Then it would sink to the bottom as fast as it froze, and almost all the water in rivers and ponds would freeze solid.

Why has God made water so plentiful? Because it is very useful to plants, and to animals, and to men. It is very necessary for them; they can not live without it.

VIII. EARTH.

WHAT is the earth? It is what is under our feet wherever we go. What is it called besides earth? Ground.

Is it covered with any thing? What is it covered with in winter? What is it covered with in summer? Is it covered with any thing in the roads?

What is a hill? What is a valley? It is the space of land that lies between two hills.

Here is a picture of a valley, with a rail-road coming through it.



Do you see the hills on each side? Do you see the valley between? Do you see the rail-road coming through?

There are some tall trees growing on the hills, and the ground is very rocky below. Do you see the trees? Do you see the rocks?

Is the ground hard? Not very hard; we can dig into it. If

you should dig into the ground in several places, should you find

it all alike? No, I should find a great many different kinds of ground.

What is a rock? It is something in the ground very hard. What is the difference between a stone and a pebble?

A pebble is very small, and smooth, and roundish. A stone is larger. Where do we find a great many pebbles? In the brooks, and by the shore of the sea.

What good does the ground do? Plants, and trees, and flowers grow up out of it in the gardens and fields.

Is there ground under this house? Where must we go in order to see the ground under the house? We must go down into the cellar.

Is there ground under the brooks and rivers? Do you suppose there is ground under the sea?

Do you know how people can find out how deep the sea is? I will tell you how. They tie a heavy piece of lead upon the end of a long line, and let it down till it touches the bottom. Then they know how deep the water is by the length of the line.

Do you know what a mountain is? A mountain is land that rises very high into the air. Did you ever see a mountain? Did you ever see a hill? A mountain is like a hill, only it is a great deal higher. A mountain is very high indeed. Trees and forests grow all over its sides, and the top is very often covered with snow. The sides are so steep and rocky too, and the way is so rough, that it is often very difficult to get to the top.

Would you like to see a picture of some mountains? We will turn over the leaf and see one.



See how high the mountains are ! • The tops of them are covered with snow. Do you see the white snow ?

The dark places on the sides of the mountains are forests, but they are so far off that we can not see the trees.

There are some trees near that we can see. They are very high trees, but the mountains are a great deal higher.

Why is the ground formed with hills, and valleys, and mountains ? Because such a variety makes the country look more agree-

able, and the water runs off in brooks and rivers, and plants grow better.

Did you know that there were a great many different kinds of ground? It is a fact that there are a great many different kinds.

What is clay? It is a very fine kind of earth or ground, that is very sticky when it is wet, and very hard when it is dry. What is it good for? Bricks are made of it, and jugs, and milk-pans. How do they make the bricks, and the jugs, and the milk-pans? They shape them first in soft clay, and then burn them hard in a hot fire.

What are rocks and stones good for? They are used to build houses with, and bridges, and walls. Why are stones better than wood for bridges and walls? Because they never will rot.

What is sand? It is coarser than clay, and does not stick together when it is wet. What is it made up of? Of very small particles, hard like little stones, and generally with sharp edges. Can we see these little particles in sand? Yes, we can, if we look very carefully.

What is sand good for? It is good to scour things with, and it makes drier roads. Where is it found? It is generally found very deep in the ground, and in the bottoms of brooks and rivers. What good does it do in these places? The water that comes down in the rain gets strained through it, and so becomes clear in the wells, and springs, and brooks. If it were not strained in this way it would not be good to drink.

What color is sand? It is of different colors—black, white, yellow, gray, and red.

What is gravel? It is a very coarse kind of earth, full of stones

and pebbles. What is gravel good for? It makes very hard walks and roads.

What other things that are useful are brought up out of the ground? Iron, and salt, and marble, and lead, and water, and a great many other things.

What other things come up out of the ground? All trees, and grass, and flowers.

IX. THE AIR.

Is there any thing in this room besides the furniture and the things which you can see? Yes, it is full of air.

Where is the air in the room? It fills the room above us and around us every where.

How do you know that there is air in the room? When we walk fast, or run about, we can feel it against our faces.

Swing your hand about fast. Can you feel it? How does it feel? Why do we not always feel it when we walk about? Because it is so light and thin.

Why do we not see it? Because it is so perfectly transparent.

Is there air in the other rooms of the house? Is there air out of doors? Does the air from out of doors ever come into the house? How? It comes in through the windows, and through the doors, when they are open.

What is air called when it is moving? It is called wind. If it moves very fast, it is a high wind.

Does the air out of doors move? Is it ever perfectly still? How

can you tell that it is moving? I can see little particles of dust moving about in it.

Does it ever move very fast? When it moves very slowly, is it called wind? No, not if it moves so very slowly that we do not feel it. We only call it wind when it moves so fast that we can feel it, and when it makes the leaves wave on the trees.

Is it always windy? Does the wind ever blow when it rains? Does it always blow when it rains? Does it ever blow when it is pleasant? Does it always blow when it is pleasant?

Does the wind always blow when it is cold? Does it ever blow when it is warm?

Do you think that the wind always blows the same way? No, indeed. Sometimes it blows in one way and sometimes in another way. How can we tell which way the wind blows? We can tell by seeing which way the smoke goes from a chimney, or by a vane. Sometimes we can tell by the looks of men or animals struggling against it.



Here is a picture of a man riding in a wild place in a windy day. Can you not perceive which way the wind is blowing? It is blowing against him. Don't you see how it blows his hat over his face? Do you see how it blows

the hair of the horse's tail? Do you see the horse's ears bent back? That is because the wind blows in his face, and makes him feel a little cross.

When the wind blows from the north, what is it called? It is called a north wind. When it blows from the south? From the west?

Does the wind blow to-day? Which way do you think it blows?

Does the wind ever do any injury? What injury? Sometimes it blows away people's hats. Sometimes, too, when it is very high, it blows down trees, and carries away the roofs of houses and barns.



At sea it makes great waves, and then the ships are tossed about dreadfully.

Here is a picture of a ship at sea in a great wind. The sails are almost all taken in, and the ship is going up and down over the great waves.

Do you see the great waves, and the ship going up over them? Do you see the clouds in the sky?

What is such a high wind as this called? It is called a gale. And when the wind is strong enough to blow the sails to pieces, and dash the ship on the rocks, and blow down trees, and houses, what is it called then?

It is called a hurricane.

Does the wind ever do any good? What good? It carries away smoke and bad air, and it makes the weather cool and pleasant. It also brings clouds and showers which water the ground.

Does the wind do any good at sea? What good? When it blows gently, it carries the ships and the sail-boats very smoothly and pleasantly over the water. Here you see them sailing along.



Do you see the sails all spread? The wind blows against the sails, and so blows the vessels along over the water.

Of what use is air to us? We breathe it, and it keeps us alive.

What makes your bosom swell when you breathe? It is the air which you draw in. If you breathe fast, you can hear the air passing in and out.

How do you know it is necessary to breathe? If we hold our breath a few moments, we feel distress.

Can persons live long under water? Why not? Can fishes

live under water? Yes, because they breathe the water itself, which we can not do.

Suppose a person should be shut up in a small, tight place, where there was but little air, what would become of him? He would be suffocated. If you should be shut up in a trunk, or a chest, or a box of any kind, and the lid were to be shut down tight, in a few minutes you would breathe all the air that there would be in the trunk or chest, and then you would be suffocated and would die.

How, then, do you think that a mouse can breathe in his hole? It is because a mouse is very small and only needs a very little air, as much as there is in his hole.

Is the air of any other use in the house besides being breathed? Yes, it makes the fire burn. How do you know it makes the fire burn? Because if the air is kept from the fire it will go out, and if the air is made to go to the fire fast it burns better.

How can we make the air go to the fire fast? By blowing it with our mouths, or with the bellows. How do you know that the bellows makes the air go to the fire? We can feel the air coming out of it if we hold our hand to the nose of it.

Suppose a fire should be made out of doors, would it burn fastest in a still day or a windy day? Why?

What good does the air do out of doors? It bears up the clouds; and the birds can fly by means of it. How does it bear up the clouds? They float in it, just as wood does in water.

Which then is lightest, the clouds or the air?

How do birds fly by the air? They strike it with their wings, and so lift themselves up by it.

Here is a picture of a bird flying, to show you how he strikes the air with his wings. He must strike the air very quick and very hard, in order to fly.



Do you think that we could fly if we had wings? No, because we should not have strength to strike the air hard enough and quick enough to lift ourselves up, even if we had wings. Is a bird then stronger than a man? Yes, a great deal stronger in proportion to his size.

Could birds fly if there were no air? No, they could not. Why not? Because there would be nothing for their wings to strike against, and so they could not lift themselves up from the ground.

Suppose the air had been much thinner and lighter than it is, what would have been the harm? Then it could not have supported the birds and the clouds.

Which is heaviest, the air, or smoke, when it comes out of a chimney? How do you know? Because the smoke goes up. What makes it go up? The air is heavier, and so crowds down under it and buoys it up.

Suppose smoke were the heaviest, where would it go when it comes out of a chimney? It would roll down the roof of the house, and perhaps would come in at the doors and windows.

Which is heaviest, water or air? Suppose air had been heavier than water? Then the water would have risen like smoke from

all the rivers and seas, and would have gone up high above our reach.

Suppose there had been no air? Then the birds could not fly any more, the clouds would fall down to the ground, the fires would all go out, and all animals and all people would die.

X. HEAT AND COLD.

How can you tell whether any thing is hot or cold?

What is the difference between hot and warm? What is the difference between cool and cold?

How do things become hot?

What things does the fire make hot? Does the sun make any thing hot? Does he make any thing warm? What things?

Suppose ice is put near the fire, what change takes place in it? Suppose lead is put into the fire, what change takes place in it? Which requires greatest heat to melt it, ice or lead?

Will wax melt by heat? Will iron? Yes, if the heat is very great indeed, some kinds of iron will melt. Will tallow?

What other things can you think of that will melt by heat?

Suppose water is placed where it is very cold, what change takes place? Will melted lead harden by cold? Will oil? Will milk?

Will every thing that is solid melt by heat? No, coal will not, and wood will not.

Can you think of any other things that will not melt?

How do we know that wood will not melt? We can put it in the fire, and then we can see that it burns all away without melting.

Suppose we should put iron in a fire, would it melt? No, not in a common fire. Suppose we should put a piece of silver into the fire, would it melt? No, not in a common fire. Would it melt in any fire? Yes, a fire made very hot indeed would melt silver, and iron, and gold, and brass. How do they make such a



very hot fire? They make it in a great furnace. Here is a picture of a furnace, with a hot fire in it to melt the iron, and the melted iron running out. Do you see the melted iron running out?

There is a kind of bucket underneath to catch the iron. Do you see the bucket? It has very long handles. Why do you suppose they have such long handles? Because the melted iron is so hot that it would burn the men if they were to come very near when they take the bucket up to carry the hot iron away. So they make the handles very long.



Here is another picture of men working with hot iron, only this iron is not melted. It is only heated hot, so as to make it soft, in order that they may hammer it easily. Do you see the fire where they heat the iron? Do you see the anvil where the man is going to hammer it? There is another man at a bench filing a piece of iron.

Suppose you were to put hot iron into cold water, what changes would take place? The iron would be cooled and the water warmed. Suppose you put cold iron into hot water, what changes would take place? Then the iron would become warmed and the water would be cooled, till they were both alike.

Suppose you put a piece of hot iron and a piece of cold iron together, what change would take place?

Suppose you put your hand upon a cold stone? Then your hand would be cooled, and the stone would be warmed. Suppose you put your hand upon a warm stone?

Suppose you carry a piece of hot iron out of doors, is there any thing cold around it? What? The air.

What change takes place then in the iron? and is the air warmed?

When we say it is a warm day or a cold day, what do we mean is warm or cold? The air all around us.

What makes the air and the ground warm?

Is it warmest in the daytime or at night? Why? Is it warmest in summer or in winter? Why? Because the sun is more nearly over our heads in summer than in winter, and so he shines down more directly upon us.

What makes our bodies warm? Do you think it is our clothes? No, our clothes do not make us warm. They *keep* us warm. The warmth comes from within us, and the clothes only keep it from going away.

How do we know that it is not our clothes that make us warm? Because our faces and hands are warm when they are not covered with clothes. Then what good do our clothes do? They keep

our bodies from becoming cold by the warmth that is within us going off into the cold air.

If you were to wrap a cold stone in furs and flannels, would it make it warm? No, it would not. Would it keep it from cooling fast if it was already warm? Is that all which clothes do for our bodies? Yes, that is all.

Sometimes, when people are going to take a sleigh-ride in the winter, and are afraid that their feet will be cold, they heat a brick or a stone by the fire, and then wrap it up in a blanket and put it in the bottom of the sleigh.

The use of the blanket is to keep the brick or the stone from getting cold too quick.

Why would a thing hot cool faster without any thing around it? Because the air which was near it would move away, and cold air would be continually coming to it and cooling it.

Suppose cold wind should blow upon a piece of hot iron, would it cool faster or slower? Why? Suppose a warm wind should blow upon a piece of ice, would it melt faster or slower? Why?

Suppose you blow upon a snowball with your breath, will it melt faster or slower where you blow upon it?

Do people ever keep ice all summer? How do they keep it? They put it in an ice-house and cover it all around with shavings, or something like that. Sometimes they keep ice by covering it up in a blanket. How does the blanket keep it cool? It keeps the warmth of the air from coming into it.

Does ice ever keep of itself all the year round? Yes, there are cold and icy countries in the world where the ice keeps of itself all the summer. It melts a little, but it does not melt entirely away.

Here is a picture of one of these icy countries in the summer, with ships sailing among the ice.



When you are out in the cold, which becomes cold soonest, your arm or your hand? Your feet or your hands? Why do your fingers become cold sooner than your wrist? Because they are out more in the air.

Suppose you run or walk very fast, does it make you warm or

cold? Suppose you rub your hands together some time, does it make them warm or cool?

If you rub two pieces of wood together very hard, will it make them warm or cool?

If you wet any thing, will it be warmer or cooler when it is drying? Will it be so if you wet it with warm water? How can you prove it? You can dip your finger in warm water, and then hold it in the air, and it will feel cool while it is drying; or you can wet your finger with your tongue, which is warm, and the spot will immediately feel cool.

DIVISION II.

THE SEASONS AND THE SKY.

I. THE WEATHER.

How many kinds of weather can you think of?

What is meant by rainy weather? What is meant by fair weather? By cloudy weather? Clear? Foggy? Warm? Cold? Frosty? Chilly? Hot? Sultry?

What is the natural color of the sky? Blue. Is it a pretty blue, do you think? When there are small clouds floating about the sky, what color are they? They are generally white. What makes them white? The light of the sun shining on them. Do a few small clouds prevent its being pleasant weather?

Did you ever observe what different kinds of clouds there are in the sky at different times? Sometimes the clouds are spread even-

ly all over the heavens, and sometimes they are in separate masses, large and rounded.

Here is a picture of one of the separate clouds, large and rounded. The upper part of it is white. The lower part is dark. We can see the land and the water on the earth below.



What makes the upper part of this cloud so bright and white? Because it is in the sunlight. The sun shines upon it. What makes the lower part so dark? Because the lower part is in the shade. All those parts of a cloud that the sun can shine upon are bright; but all those parts that are shaded by some other part are dark.

When the clouds cover the whole sky, of what color are they? They are gray, and some of a very dark gray. Why are such clouds of a dark color? Because they are so thick that the sun can not shine through them and make them bright. What weather is this called? Cloudy weather.

Does it always rain in cloudy weather? How does the sky look when it is rainy weather? It looks dark and gray.

Where does the rain come from? From the sky. What is rain? It is water falling in little drops out of the sky.

What is the shape of the drops of rain? Round. Where do the drops come from? They are formed in the sky by the water of the vapor gathering together.

Are the drops of rain always of the same size? No; generally they are very small, but sometimes they are pretty large. When the drops are so small that they are not heavy enough to fall, so as to make rain, what do we call it? We call it a mist or a fog.

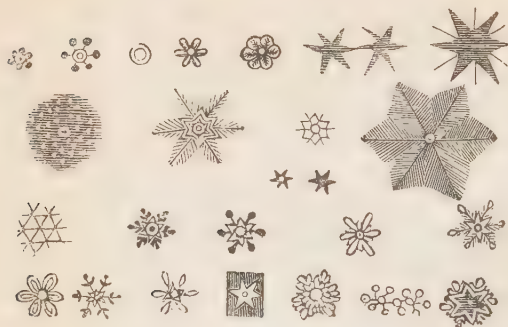
Does the rain always fall straight to the ground? Why not? If it should fall straight toward the ground, would it ever strike the window. No; the drops could never come against the window unless they were blown against it by the wind.

How do the clouds look just before it clears up after a storm? They look bright and broken.

What is snow? Are the flakes always of the same size? Are they always of the same shape? No; they are of a great many different shapes. How can we find out what the shapes are of the flakes of snow? We can hold out the top of a hat or any thing black for a minute when it is snowing, and so catch some of the flakes.

What good does the rain do? It waters the ground and makes the things grow in the gardens and fields. Then besides this it fills the ground up with moisture, and so causes the water to gather in the wells and springs. All the wells would soon dry up if there were no rain.

Here is a picture of flakes of snow of the different kinds. Don't



you think they are very pretty? Which do you think is the prettiest of them all? Some of them are very large.

When there is another snow-storm, perhaps I will hold something black out at the door and catch

some of the flakes and let you see them, and then we can see whether they are like any of these.

Are the flakes of snow always the same through one storm? No; sometimes they change suddenly in the midst of the storm, and sometimes two kinds of flakes are falling at the same time.

Which falls through the air the swiftest, snow or rain? Why?

What is hail? Hail is formed of frozen drops of rain. What is the difference between hail and snow? Hail is hard and solid, but snow is light.

What is fog? Fog is formed of very fine drops of water floating in the air. What is mist? Mist is pretty much the same, only the drops are a little larger, large enough to fall toward the ground slowly, but not so large as the drops of rain.

What good is done by rain? The rain makes the grass grow, and the corn, and the grain, and the flowers. The grass grows so high, that at last the mowers cut it down with a scythe. By-and-

by we shall come to a picture of a mower whetting his scythe, in order to cut down the tall grass and make it into hay. Did you ever see how tall the grass grows in a mowing-field? The grass would not grow so tall if it were not for the rain that falls and waters the ground.

II. THUNDER AND LIGHTNING.

IN what part of the year is the weather cold? In the winter. In what part is it warm? In the summer.

What effect does the cold weather of winter have upon the ground? It makes it hard. It freezes the water that is in the ground, and that makes the ground hard.

What effect does it have upon the trees? It makes the leaves fall. What effect does it have upon the water?

Do the rivers and the ponds in the winter freeze solid to the bottom, or only upon the top? They only freeze upon the top. Why do they not freeze solid? Because the weather grows warm again before the water becomes cold very far down.

Do we ever have snow-storms in the summer? Do we ever have hail-storms in summer? Yes, very often. Why do we have hail in the summer? Because it is sometimes very cold high in the air, though it is warm near the ground, and the hail is formed high in the air where it is cold.

Why do we not have snow too in the summer? Because if snow should form in the sky it would melt before it could reach the ground, the flakes are so light and feathery. Why does not the

hail melt? Because it is more solid and heavy, and so it falls quicker, and gets to the ground before it has time to melt.

In what part of the year do we have thunder-showers? In the summer. Does it usually begin to thunder or to rain first?

Do we always hear the thunder and see the lightning at the same time? No; we see the flash of the lightning before we hear the thunder. Did you know that they are always, in fact, exactly together? They are. The lightning and the thunder always happen together. Then why do we not hear them together? Because they are sometimes a great way off, and the light of the lightning comes to us quicker than the sound of the thunder, so that we see the lightning first, and then afterward hear the sound. Then, when we see a flash of lightning, shall we generally hear the thunder soon?

Suppose the cloud where the lightning is, is near us, would the thunder and lightning appear nearer together or farther apart? Why?

When a cloud is coming up in the daytime, which do we notice first, the thunder or the lightning? Why do we not see the lightning as soon as we hear the thunder? Because the bright light of the day prevents us from seeing it until it is very near.

When a cloud is coming up in the night, which do we notice first, the thunder or the lightning? Why? Because it is dark, and the lightning appears brighter, and we can see it when it is too far off for the thunder to be heard.

Do we often see lightning in a very distant cloud in the evening without hearing the thunder? Is there always thunder there, though we can not hear it? Yes.

In what part of the sky do we see the rainbow? Usually in the east. In what part of the day? In the evening.

How is it produced? By the sun shining upon the drops of water in a shower.

Where must the sun be to make a rainbow? It must be opposite the cloud. If the cloud is in the east, where must the sun be? If the cloud is in the west, where must the sun be? Where is the sun in the morning? Then will morning rainbows be in the east or in the west? Where is the sun in the evening? Then will evening rainbows be in the east or the west?

III. THE SUN.

WHAT is the largest shining body in the sky? The sun. What is the next largest? The moon.

What other shining bodies are there? The stars.

Is the sun much *brighter* than the moon? Is the moon much brighter than the stars? Which of these heavenly bodies dazzles your eyes? Which gives the greatest light?

Does the sun always look of the same size and shape? Yes; he always looks large, and full, and round. Does the moon always look of the same shape? No; the moon changes her shape every day.

Are all the stars of the same size? Are all of the same brightness? Do you think you could count the stars?

Is the sun always in the same place? Is the moon? Are the stars?

Where does the sun rise? In the east. At what time of the day does he rise? In the morning. Which way does he seem to move after he rises? Up in the sky. How long does he continue to rise higher and higher? Till noon.

How does the sun appear to move in the afternoon? He seems to go down on the other side of the sky. Where does he set? In the west.

Do we see any of the light of the sun before he rises? What is this light called? It is called the dawn.

Do we see any of the light of the sun after he sets? What is this light called? It is called twilight.

Suppose God had so made the world that there was no dawn, would it have been as well for us? No; the light of the sun would then burst upon us very suddenly in the morning, and would dazzle us.

Suppose God had made the world so that there should be no twilight, would it have been as well for us? No; for then, when the sun went down at night, we should all be left in very sudden darkness.

Does the sun shine upon us all the time? Does he shine upon us always in the daytime? Not always, for sometimes it is cloudy. When it is cloudy, do we see the light of the sun at all? Yes; a great deal of light shines through the clouds.

When the sun rises in the morning in the east, does it come directly upward into the sky, or go off a little toward one side? How can we tell? We can watch it some morning when it rises.

Does it go toward the north or toward the south? It goes toward the south.

What is that part of the day called when the sun is highest? Noon. What o'clock is it called? Twelve o'clock. Is the sun exactly over our heads at noon? No, not exactly. Why not? Because he does not go directly upward when he rises, but passes off a little toward the south. What is that point in the sky which is exactly over our heads called? The zenith. Which way from the zenith will the sun be at noon? Toward the south.

Upon which side of this house do you think the sun will shine at noon?

What good does the sun do? He gives us light, and he also warms the earth, and makes the flowers bloom, and the corn and the fruits ripen.

Here is a picture of flowers blooming in the sun. There is a



girl gathering them. These flowers are not growing in a garden,

but in a field. We can see the hay-makers making hay in the back part of the field. It is the sun that dries the grass to make it into hay, and at the same time opens the flowers, and makes them bloom beautifully.

Did you ever go and take a walk in a mowing-field and see the farmers making hay? Would you like to go with me some day?

The sun ripens the fruits too—the apples, the strawberries, the raspberries, the peaches, the melons, and the grapes.



Here is a picture of a young girl gathering beautiful clusters of grapes which have ripened in the sun. She is giving them to some children.

Do people ever fret and complain because the sun is hot? Is that right? No, it is very wrong; and people who fret and complain because the sun shines bright and the day is warm ought not to have grapes or peaches.

Do people ever fret and complain because it rains? Is that right? No, it is very wrong; and people who fret and complain because it rains ought not to expect to have any bread or meat, or any thing else that comes from the fruitfulness that the rain produces in the ground.

IV. THE MOON.

WHEN does the sun shine? In the daytime. When does the moon shine? Do we ever see the sun in the night? Do we ever see the moon in the daytime?

Is the moon always of the same shape? What is the shape of the moon when it is largest? What is it then called? Full moon.

Can you see any thing on the moon when it is full? Yes; we can see faint lines, and shadings, and irregular spots.

Can we see the moon every night? Why not? Sometimes it is cloudy, and sometimes the moon is not in the sky.

What is the shape of the moon when it is smallest? It is of the shape of a bow. What is it called then? New moon. Can you see the spots on it then?

What is the moon? It is a large world. Why does it look so small? Because it is so far off. Do other things look small when they are a great way off?

Which is the farthest off, the moon or the clouds? How do we know? Because we see that the clouds come between us and the moon, and that proves that they are nearer to us than she is.

What makes the moon look bright? Because the sun shines upon it. Do we see the whole of the moon? No, only that part which the sun shines upon.

Is the moon always *really* of the same shape? Yes, it is. Why does it seem to be so different in shape at different times? Because the sun shines upon different parts at different times.

How much of the moon is really always bright? One half of it. Which half? The half that is turned toward the sun.

Is that bright half of the moon always turned toward us? No, not always. The whole of the bright part is turned toward us when the moon is full, but at other times only a portion of the bright part is turned toward us—sometimes more and sometimes less—and that is what makes the moon appear of such different shapes.

Does any warmth come to us from the moon? No, none at all. What does come to us from the moon? Light. Where does the light of the moon come from at first? It comes at first from the sun. It strikes upon the moon, and then shines off again toward us.

V. THE STARS.

WHEN can we see the stars? In the night. In what part of the sky are the stars? They are scattered about all over the sky. Can we always see the stars in the night? Can we ever see them in the daytime?

When the stars first appear in the evening, do they all begin to shine together? Which do we see first? The brightest.

Do we see the stars before the sun goes down? Do we see the stars immediately after the sun goes down? Is it light at all when we first see the stars?

Why do we not see any except the brightest at first? The light in the sky prevents it. Do the stars that are first seen look bright

or faint? Why do they look faint? Does a lamp look faint in the daytime?

What makes the stars grow brighter and brighter as the evening comes on? Because the light of the sun fades away more and more, their light can shine out better, and so we can see them more distinctly.

When the stars are all to be seen, do they all appear alike? No, they do not. Are they all equally large? Are they all equally bright? Are they placed regularly or irregularly in the sky? Could you count the stars?

Are there as many stars to be seen, and do they look as bright when the moon shines as when there is no moon? What do you think is the reason?

Can we see the stars all night? Can we see them in the morning just before the sun rises? Do they seem to fade away, and go out gradually as the sun comes up, or do they move away from the sky?

Why do they grow faint as the sun comes up? Because the sun overpowers the light of them.

What do you suppose is the reason that we can not see them in the daytime?

Do you think that the stars are pretty? I think they are very pretty indeed. Which do you think is the prettiest, the sun, or the moon, or the stars?

Do you think that there are any other bright bodies in the sky besides the sun, moon, and stars? There are sometimes comets. Do you know what a comet is? It is something with a bright head and a long spreading tail.

Here is a picture of one going through the sky. Some people



are frightened when they see a comet ; but comets never do any harm.

Do you see the head of the comet ? Do you see the long spreading tail ? Do you see stars in the sky around the comet ? Do you see some bright places in the sky among the stars ? Those bright places are made by millions and millions of stars that are so far off that you can not see them singly. We can only see them by the brightness that all of them together make in the sky.

What an immense number of stars there must be ! *Immense !*

DIVISION III.
T H E B O D Y.
I. THE JOINTS.

IN how many places will your forefinger bend? Try the rest of your fingers, and see if they will all bend in three places. In how many places will your thumb bend? What do you suppose is the reason that your fingers are made to bend?

Hold your fingers out straight; now can you bend them most easily *toward* the palm of your hand, or toward the back of your hand? Why are they made so? Because we wish to bend them toward the palm of the hand in order to take hold of things; but we have no occasion to bend them back.

Is there any difference between your finger and your thumb? What difference is there in shape? What difference is there in size? Does your thumb bend in the same direction with your fingers, or in an opposite direction?

Can you shut up three of the fingers of your hand, and point with the forefinger like this? Can you point with the middle finger and shut up the other three? Not very well. Can you point with the little finger, and shut up the other three?



Suppose you had no thumb, could you take up any thing with

your fingers alone? Could you take up any thing very conveniently?

Try and see whether you can take up something with your fingers alone.

Have you any thing like fingers upon your feet? Have you a thumb upon your feet? Have any animals thumbs on their feet?



Yes, monkeys and baboons. Here is a picture of a big baboon. Do you not see that his feet have got thumbs on them? What good do the thumbs on his feet do him? By means of them he can take hold of things with his feet as well as with his hands; and why should a monkey or a baboon need to take hold of things with his feet more than a man? Because such an-

imals as they are made to climb about among the trees in the forests where they live, and by taking hold with their feet as well as with their hands, they can climb a great deal better.

Why do they have to climb about on the trees? To get nuts, and fruits, and other such things growing on the trees, which they live upon.

Is there any difference between my hand and yours? What difference?

Which is smoothest and softest, the palm of your hand or the back part of your hand? Why is this? Why will your fingers bend in one place more easily than in another? Because there are joints where they bend. What is the name of these joints in the fingers? They are called knuckles.

Are there any other joints in your body besides those in your fingers?

What are the names of them? The wrist is one, the elbow is another; then there is the shoulder, and the knee, and the ankle.

Hold your arm out straight; now can you move your hand up and down, keeping your arm still? Can you turn it over?

Hold your hand out straight; now can you move your forefinger up and down while your hand is still? Can you turn it over? Then, is the joint of your knuckle different from the joint at the wrist, or like it?

Can you move your arm every way at the shoulder? Can you move it every way at the elbow? Can you move your foot every way at the ankle? What good do your hands do you? What good do your feet do you? Could you use your hands and arms without joints? Could you use your feet without joints?

Suppose a person should have no joints, in what difficulty would he be? He could not walk, or sit down, or take up any thing, or point, or move in any way.

Should you think the joints of the fingers would be very strong? No; we should not think they would be very strong, because they are so small. But they are very strong indeed. Sailors can bear

their whole weight upon them, when they are climbing up a rope.



Here is a picture of a man who has fallen over the rocks, and he is holding himself on the edge almost entirely by his hands. How strong his finger joints must be! Do you

think you could hang in this way by your fingers alone?



Have birds got hands? No; but they have beaks and claws, which they use to take and hold things with. They pick up small things with their beaks, but hold large things with their claws.

Here is a picture of a kind of hawk. Don't you see that he is holding some-

thing in his claws? What is it? It is a rabbit. The hawk has killed the rabbit, and now he is going to eat him. He will hold him in his claws, and pull his flesh to pieces with his beak. Birds take up small things with their beaks.



Here is a picture of a bird just going to pick up something to eat from the water. She is going to pick it up with her beak. Do you see her beak?

Do you know the name of this bird? It is the swan. It is a black swan. Swans are generally white, but this

one is black. See her foot. Her foot is made like a paddle, so that she can swim with it in the water. A bird can not take up any thing with such a foot as that.

II. THE EYE.

How many eyes have you? What are your eyes for? How many eyes have I? How many eyes has the cat? How many eyes has the dog?

Has every living thing two eyes? No; spiders, and flies, and some other animals have a great many eyes, but they are very small.

Where are your eyes? Why are our eyes made so near the top of our head? Because we can see better with them than if they were placed low.

Why would not it have been as well to have had them in the back of our head? Because then we could see only behind us, and not before us where we want to go.

Why would it not be as well to have our eyes higher, quite upon the top of our head? Because there would be danger that things would fall into them, and besides we could then only look up into the air.

Why would it not have been as well to have had our eyes upon our hands? Can you not think of any place where our eyes would be better than as they are?

Where are your eyebrows? What are they? What good do eyebrows do? They keep the dust and motes that may be in the air, and also the perspiration of the face, from rolling down into our eyes.

Where are our eyelids? What are they? They are little coverings that shut over our eyes. What good do they do? They close our eyes up when we wish to go to sleep, or when the light is too bright.

Has the cat eyebrows? Has she any eyelids? What difference can you observe between the eyes of a cat and those of a child?

Are the eyes of all children alike? What difference is there in them?

Do you know how it is that we see with our eyes? I will tell you. The light comes in through a small, round place, in front, which is clear like glass, and it forms little pictures in the back of our eye. Can you see this little, round place that the light shines through in my eye? How does it look? It looks round and black. Why does it look black? Because the inside of the eye that we look into through it is dark.

Is this opening through which the light passes always of the same size? No; when there is but little light it grows large, so as to admit as much light as possible, and when there is a great deal of light, it grows smaller, so that we may not be dazzled.

Can we see the black spot in each other's eyes grow larger and smaller in this way? Yes. How must a person be placed to make it look large? He must be placed somewhere where it is nearly dark. How must a person be placed to make it look small? He must be turned toward a strong light.

Suppose the front part of the eye should become dusty? Then the light would not pass through it well, and we could not see plainly. Why does it not sometimes become dusty? Because our eyelid moves down over it often and wipes it, and so keeps it always nice and bright.

Suppose any thing gets into our eyes, does it hurt us? Yes, it hurts us very much indeed. Suppose any thing gets into our *mouth*, does it hurt us?

What other good do our eyelids do? They shut up our eyes when we wish to go to sleep. Do you think there would be any harm in having our eyes open when we go to sleep? What would be the harm?

Here is a girl gone to sleep in her chair. See! Her eyes are

shut, and her head has fallen back. What do you think she was doing before she fell asleep? What makes you think she was reading?



Don't you see that the light would shine in her eyes and keep her awake, if it were

not for the eyelids that come down over them and cover them up?

III. THE FACE.

How many noses have you? How many noses have I? How many has a cat? How many has a dog?

What is your nose for? To smell with. What else is it for? To breathe through when our mouth is shut.

Suppose we had no nose, how should we breathe? We should be obliged to keep our mouth open all the time.

What is our mouth for? To eat with. What is there in it that makes it convenient to eat with? There are teeth with which we chew our food, and a throat by which we swallow it.

Are all our teeth alike? Which are the sharpest, the front or the back teeth?

Will your teeth be large enough for you when you grow up? No; those you have now will not be large enough; but they will become loose and be pulled out, and larger and better ones will grow in their places.

What else is a mouth for besides eating? To talk with. What parts of our mouth do we use to talk with? Our tongue and our lips.

Which do you use, your tongue or your lips, in saying m. You use your lips. Try: m. Which do you use in saying l? s? p?

Has the cat a mouth? Has she a tongue? Has she any lips? Then why can she not talk? Because she has not any mind, she can not think.

Suppose that God had not given you any mind? Then I could not think or talk; I could only eat, and drink, and sleep, like the cat.

Are the faces of dogs, and horses, and other animals shaped like a man's face? No; they are very different. Have birds any face?

Yes, they have a kind of face, but it is very different from a man's. The owl has the biggest face of any bird. See! What a face! What staring eyes! His eyes make up almost his whole face.

The owl is a night bird. He keeps still in the daytime, and flies in the night. He can see very well with his great eyes in the night. He can see when it is almost entirely dark.

But now here is another bird that has scarcely any face at all.





The name of this bird is the hoopoo. He has scarcely any face at all. He has eyes, but they are very small; and he has no nose, but only a long, curved bill instead. He has no cheek, and no chin.

The hoopoo is remarkable for a great tuft on the top of his head. Which do you think is the pret-

tiest bird, the hoopoo or the owl?

What do animals do with their mouths that men do not? They take up things and carry them with their mouths. Have you ever seen the cat carry things with her mouth? Why does she do so? Because she has no hands. Why can she not carry things in her fore paws? Because she is obliged to use all her feet to walk with.

Which has the sharpest teeth, a cat or a horse? Why should the cat's teeth be sharpest? Because she feeds upon flesh, but the horse eats grass and hay.

Has the cat any voice? Yes; she can mew. What can a dog do with his voice? He can bark. What does the horse do? The cow? The goose? The pig?

Do you think it would be better if all animals made the same noise? What advantage is there in their making different noises?

What is the chin for? It is to hold our lower teeth, and to move them up and down when we eat. How can we move our chin? Up and down.

Can we move it any other way beside up and down? Yes; we can move it a little from one side to the other.

Can the cat move her jaw up and down? Yes. Can she move it from side to side? No, she can not. Why is the cat's jaw made so that she can not move it from side to side? Because she eats flesh that does not need that grinding motion.

Does the horse eat flesh? What does he eat? Hay and corn. Does his food need the grinding motion of the jaw?

Should you think that his jaw would be made so as to move from side to side? Yes; it is made so.

Does the cow move her jaw from side to side as well as up and down? Yes. Why is it necessary for her? The sheep? The mouse? No. Why not? Because the mouse does not grind up his food with his teeth: he gnaws it fine while he is taking it in.

Did you ever see a little mouse gnawing a kernel of corn, or a piece of cracker? It is very curious to see. Some day perhaps you will see a little mouse alive in a trap, and then you can give him some corn or a small piece of cracker, and see him gnaw it. He holds the thing in his little claws while he gnaws it.

It is very curious also to see a squirrel sitting on a log in the woods and gnawing a nut. He holds it in his claws, and gnaws it with his teeth. Would you like to see one? Perhaps you will some day.

Are the faces of all men of the same color? No; some men are black, and some that are not black are still of a very dark color. Are colored people generally cross and bad in their dispositions, or gentle and kind?



They are generally very gentle and kind. Here are some colored children looking out at a window. Do you think they look ugly and cross? No, indeed.

How ought we to treat colored people, then? We ought to treat them very kindly. Is it right to point at them when we see them, or call them names, or make fun of them because they are black? No, indeed.

These children are a girl and a boy. They are looking out at a window to see something going by in the street. I think it must be something funny. What do you think it is?

IV. THE EAR.

WHAT are your ears for? Suppose your ears were stopped, could you hear? How many kinds of sounds can you think of which you can hear with your ears?

Suppose you had no ears, could you understand me when I talk to you? Do you think you could talk yourself if you had no ears? No, you could not; for if you could not hear others talk, you could not learn to talk yourself. You would not know how to speak the words.

Are there any persons who can not hear? Yes, many. Can such persons talk? No; they can not talk, unless they learned to talk before they lost their hearing.

Suppose they never could hear? Then they can not talk at all.

How do such persons make others understand what they want? By signs. They have a great many curious signs and gestures to signify what they mean.

Are the ears of animals shaped like those of men? What ani-

mal can you think of that has long ears? Do you see what long ears this rabbit has? What good do such long ears do? They catch the sound better.

Can you move your ears? Can the cat move her ears? Can the

horse? Can the cow?

Can a bird hear? Has a bird ears? Yes; a bird has very



small ears, but they are away under her feathers, so that we can not see them.

How do we know that birds can hear? We see that they are often frightened away by a noise.

Do you think that a fly can hear? Can a horse hear? How do you know that a horse can hear? Because he comes sometimes when we call him; and when we command him to stop or to go on, he obeys.

Are there any other animals that will obey men in this way?

Yes; the dog, and the ox, and the camel. Here is a picture of a camel, with his driver walking by the side of him. The driver is speaking to the camel, and the camel is listening. He obeys all that the driver says.

He turns this way and

that, as the driver commands him, and kneels down when ordered, so as to let the driver get on his back. There is a camel in the distance in this picture, kneeling down to let a rider mount. Do you see him? Do you see the camel's ears?

Are all sounds pleasant for grown people to hear? Think of some sounds that are pleasant. Think of some sounds that are



not pleasant. What is noise? We call noise any sound that it is not agreeable to hear.

Is the singing of a robin called noise? Why not?

How can you make a noise? Do children generally like noise? Yes; they generally like to hear noise, and they like very much to make it. Which is it pleasantest to hear, the noise that we make ourselves, or that which other people make? The noise that we make ourselves. If a boy had a drum, and was drumming on it himself, or if he was sounding a loud rattle, he would like to hear the noise, but if another boy was playing with the drum or the rattle while he was doing something else, the noise would disturb him.



Here is a picture of a boy making a dreadful noise. What is he doing? He is firing a little cannon. What is the cannon loaded with? What is he touching it off with? What is he holding the coal in that he is touching off the cannon with?

Why does he hold the coal in a pair of tongs?

Do grown people generally like to hear a noise? Then is it right for people to make a noise where grown people are? Why not? Because it is not right for us to do any thing to give pain to other people unless it is necessary.

V. THE HAIR.

WHAT is your hair for? To cover my head, and make it look prettier.

What color is it?

How comes it upon your head? It grows out slowly. Is there any hair upon the back of your hand? Is there any upon the palm of your hand?

Is the hair of different persons always of the same color? Name some of the different colors.

Has every body the same number of fingers?

Why are every body's fingers alike, and not their hair? Because it is of little consequence what the color of the hair is, but four fingers and one thumb are better than any other number.

Does the hair of animals grow only upon their heads? No; it grows over their bodies.

Why is hair made to grow all over them? Because they would not know how to make clothes for themselves, and so God clothes them with hair.

Suppose animals had understanding enough to know how clothes were made, do you suppose that they could make them? No, they could not. The reason is that they have no hands or fingers to spin the thread with, or to weave the cloth. Animals have neither understanding nor fingers, but men have both; and so clothing grows of itself upon animals, while men are left to make it for themselves.

Here is a picture of a white bear. He lives in the cold countries of the North, among the icebergs. Don't you see how thick and warm his hair is? If he had no hair to clothe him and make him warm, do you think he could make clothes for himself?



Is the hair of all cats of the same color? Name some of the different col-

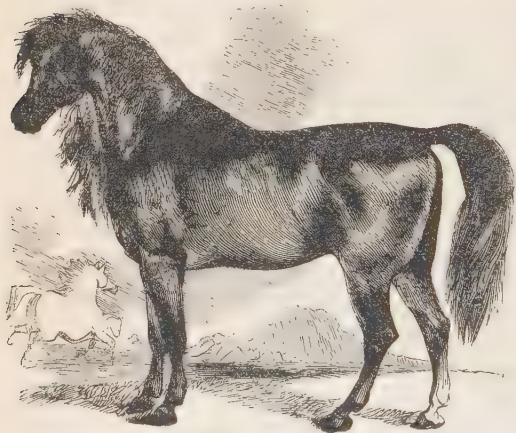
ors? Does the same cat have hair of different colors? Does the same man ever have hair of different colors?

Is an animal's hair ever red? What animal's? A fox has a reddish-colored hair. So have horses often. Is the hair of any animals white? What animals? Black? Green?

Do you know of any reason why an animal's hair should not sometimes be green as well as red? Neither do I know.

Is the hair of animals every where of the same length? Is the hair of the horse any longer in some places than in others? In what places? Long hair hangs down the sides of his neck, and the hair of his tail is long. There is also some long hair on the top of his head, that hangs down over his forehead.

What is all this long hair of the horse for? To keep off the flies. What harm would the flies do to the horse? They would bite him.



What part of his body does his tail keep the flies off from? All the back part of his body and his hind legs. He moves his tail about and brushes the flies off, as far as the long hairs will reach.

What part of his back do the long hairs of his mane protect? His neck. What part of his body do the long hairs on the top of his head protect? His forehead and his face.

Do you see a horse in the picture galloping away?

How does he keep the flies off from the middle of his body, where his tail will not reach? He bites them off. He reaches round with his mouth and rubs or bites them off.

Why could not the horse bite off the flies from the back part of his body too? Because he could not reach so far. Why could he not bite them off from his neck if he had no mane? Because he could not turn his head short enough to reach so near.

Is the hair of all animals equally soft and fine? Which is soft-

est, the hair of the horse or of the hog? The cow or the cat? The dog or the mouse?

Which will grow the longest, a girl's hair, or the hair of a dog? A girl's hair.



Here is a picture of two girls, and one of them is braiding the other's hair. See how long her hair is! And how beautiful it is! That is her sister who is braiding her hair. She is braiding it very carefully.

I see a part of a table with something upon it. It seems to be a pincushion. I suppose there are some pins in the pincushion.

How long, and smooth, and glossy the girl's hair is! Is the wool of a sheep long, and smooth, and glossy? Is the hair of a dog? Is the hair of a mouse?

Which should you think would be the warmest, the coarse or the fine hair? Which would you think would have the finest hair, then, large animals or small? Why? Because small animals are more delicate and more exposed to the cold.

Which should you think would have the finest hair, animals in warm or in cold countries? Why? What is the finest and softest hair called? In what countries is it obtained? In cold countries.

What is wool? How does it differ from other hair? What animals have wool? Have all animals hair? What animals do not? Birds have not. What do birds have instead of hair?



Here is a picture of a bird. Don't you see his feathers? We can see them very plainly in his tail, but we can not see them on his breast, for there they are small, and they lie down smooth and close together.

A feather is a very curious thing. Should you like to have me some time get a feather, and let you look at it, and show you how it is made?

This bird is a crane. He is made to wade in the water. See what long legs!

Do all animals have either hair or feathers? No. Some fishes



have scales, and frogs and toads have no outward covering at all. Some animals have shells, and some have a sort of armor formed of little horny plates, something like the scales of a fish. Here is a picture of

one of them. The name of this animal is pangolin. Do you see the little scales all over his body?

What are these scales for? They are to keep other animals from biting him.

Which would you prefer, if you were an animal, to have a tail and mane to brush off the flies with, or scales to keep them from biting you?

VI. THE FEET.

How many feet have you? Have all persons two feet? Have animals two feet?

What animals do you think of that have more than two feet?

How many feet has a bird? A fly? A horse? What is the knee? It is a joint in the middle of the leg. Of what use is it? Have animals knees?

How many knees has the cat? The horse?

Could we walk well without knees? Could we walk at all? Would you like to try how well you can walk without bending your knees?

What is an ankle? It is a joint between the leg and the foot.

Of what use is the ankle? We can bend our foot by means of it when we walk. Could we walk well without a joint at the ankle? Could we walk at all? Yes; we might possibly walk a little. You can try some day, and see how you can walk without bending your ankle joint.

What are our feet for? To walk with. What is the shape of

our feet? They are shaped flat at the bottom, so that we can stand and walk steadily.



Here is a picture of a girl walking, and you can see how she uses her feet and ankles. One of her feet is planted flat upon the ground, so that she can rest upon it steadily, and hold her pail. She is lifting up her other foot, so

as to take another step. You can see how she bends her ankle in lifting up her foot.

What is the girl carrying? She is carrying a pail. Do you think there is any thing in it? I think there is something in it, because I see she is holding her hand out to balance it. People often hold out their hands to balance what they are carrying in that way, when it is heavy.

I think this girl has been milking, and now she is carrying home the milk.

What have we on our feet that are something like the fingers on the hand? How many toes has a person on each foot?

Have animals any toes? Have they any thing like toes? What? Have all animals claws? What animals have claws? Birds usually have claws, and some beasts have claws.

What is the shape of a claw? It is shaped like a hook, and is sharp.



Here is a picture of the claw of a bird, and also of her head and beak. How many claws are there? Do you see how sharp they are? A bird can use her claws for hands to hold things with, or for feet to walk with.

Birds have joints to their claws, so that they can bend them.

They can spread them out straight when they are standing on the ground, and they can bend them round the branches when they are standing on a tree. Here is a bird with her claws spread out, because she is standing on the ground. What a funny bird it is! What a funny round eye!

And what a funny little beak! See how short and crooked it is. And do you see his little ruff, near

the top of his head, where his forehead ought to be? Do you see his spotted tail?

The feet of this bird are spread out straight, because he is standing on the ground. The ends of the claws stick into the ground a little, and keep him from slipping when the ground is steep; so, when he is standing on the limb of a tree, the claws keep him from slipping.



And now here is another bird, with her claws bent round the branch of a tree. How many feet can you see? Only one. Where do you suppose the bird's other foot is? It is drawn up under her feathers. The bird's claws are so strong that she can stand very well on one foot.



Do all animals have claws? No. Horses do not, and cows do not. Why do not horses and cows have claws? Because they have nothing to catch. Does a cat have claws? Why does the cat need

claws? Because it is her business to catch mice.

Should you think it would be necessary for a dog to have claws? Does he have claws? Why? What does the sheep eat? Is it necessary for the sheep to have claws?

Of what use are claws besides for catching prey and eating flesh? For climbing. Does the cat ever use her claws for climbing?

What does the squirrel eat? Does the squirrel need claws for his food? Does he need them for climbing? Why is it necessary for a squirrel to climb? To get nuts in the tall trees.

Do mice have claws? Of what use are claws to mice? The mice hold the little bits of bread and cheese, or the grains of corn they get to eat, with their claws, while they gnaw them.

VII. MOTION.

CAN you move your head?

Can you move it upward? Can you move it downward? Can you move it to each side? Can you turn it round?

Can you move your eyes? How many ways can you move your eyes? What advantage is there in being able to move your eyes?

Can you move your nose? Try. Would it do you any good to be able to move your nose?

Can you move your ears? Can you move your chin?

Can you move your arms? How many ways can you move your arms?

Hold your hands out straight. Now can you move one upward, and, at the same time, hold the other still? Can you move one arm upward and the other downward at the same time? Can you move your eyes in different directions at the same time? Try.

Is it often necessary for you to move your arms in different directions? Is it ever necessary to move your eyes in different directions?

Hold the thumb and finger of one of your hands out straight. Now see if you can move the thumb up and down without moving the fingers. Now see if you can move the forefinger without moving the rest. The middle finger. The little finger.

Why is not your hand made so that you can move one finger easily without moving the others? Because you seldom have any

occasion to move any finger but the forefinger separate from the rest. When people grow older, they have sometimes to move their fingers separately, as, for example, to play upon the piano; and their fingers are made so that they can learn to move them so, though they can not do it easily at first. But you never can learn to move one eye without moving the other.

Can you bend your back? Can you bend it forward? Can you bend it backward? Can you bend it to each side? What advantage is there in having your back made so that it will bend?

Which is easiest, to walk or to run? Which do you like best, to walk or to run? What is the difference between walking and running? What is the difference between walking and creeping? What is the difference between walking and hopping?

Which can run fastest, a horse or a man? How many legs has a horse? How many has a man? Do you suppose that the reason that a horse can run faster than a man is because he has more legs? No, that is not the reason.



Which can run fastest, a horse or a dog? One can run just about as fast as the other. Here you see a horse and a dog running together. Do you see how well they keep up with each other?

You had better be careful, little dog, and not get under the horse's feet.

VIII. GROWTH.

ARE all persons of the same size? Which are largest, young persons or old persons? What is the reason that old persons are largest? Because they grow from year to year.

Do children grow every year? Do men and women grow every year? No; people stop growing when they become men and women.

How old are persons, usually, when they stop growing? About twenty. Which are generally tallest, men or women?

Do all parts of the body grow? Do your feet grow? How do you know they grow? Because the shoes that we wear at one time become too small a few months afterward.

Do your hands grow? How do you know? Do your fingers grow? Does your head grow? What reason have you for thinking that your head grows?

Do your teeth grow? No, they do not grow; at least, if they grow at all, they grow very little. Are not the teeth of men larger than those of children? Why are they larger if the teeth do not grow? Because the first teeth of children, which are small, come out, and larger ones come in their places. At first they grow loose, and then, after a while, they come out.

Do your nails grow? How do we know that our nails grow? If we make a mark upon the nail near the bottom of it, the mark will move up gradually to the outer edge of the nail. How long will it take? Several weeks.

Does your hair grow? What makes you think that your hair grows?

How is it that the body grows? By something in the food which we eat, which is conveyed by little channels all over the body, and turns into flesh, or bone, or hair, or nail, and thus makes us grow.

What is the blood? It contains the nourishment from the food, and carries it around to all the body. How do we know that it is carried to all parts of the body? Because, if we prick ourselves any where, we find that the blood comes out.

Suppose a person's hair should be all cut off, would more grow in its place? Yes, generally.

Suppose a nail is cut off, will it grow out again, or a new nail grow in its place? Yes, it will.

Would a new skin grow over a place where the old skin was cut off? Would a new hand grow if a hand was cut off? No, a new hand would not grow, nor would a new finger, or a new leg, or a new foot. When a man loses his leg he is obliged to have a wooden one made.

Do animals grow? What animals can you think of that you know are first small and afterward grow to be large?

Are all men, when they are full grown, pretty nearly of the same size? Are all full-grown horses pretty nearly of the same size? Are all dogs? No, dogs are of very different sizes when they are full grown.

What advantage is there in having all men nearly of the same size? They can use conveniently the same houses, and beds, and carriages, and instruments.

Here is a curious picture of a great many men in a small room.



What do you think they are doing? One of them is climbing up.

These men are in a canal-boat. The room that they are in is a room in the canal-boat; and the boat, and the room, and the men, are all sailing along. It is night, and the men are all going to bed. The beds are in the

sides of the boat, in little places called berths. There are three tiers of berths, one above the other. Don't you see them at the sides of the room? There are curtains before the berths for the men to draw after they get in. One man is in his berth, and another is climbing in. It is very hard to have to climb up so high to get into bed.

The berths in a canal-boat are all alike. They are of the same size. And don't you see that the men are all pretty much of the same size too? So they can all sleep in any of the berths.

If there was any man among them a great deal taller than the rest, then there would not be any berth long enough for him.

What advantage would it be to any man to be twice as large as

other men? He would be twice as strong, and he could do twice as much.

What disadvantage would it be to him? His clothes and his food would cost twice as much. He could not ride in any common carriage, or sleep in any common bed, or sit in any common chair. So it would be a great deal better for him to be only just as large as other men.

Would it not be better if all men were larger or smaller than at present? No; they would find many inconveniences, unless all animals and plants were larger or smaller in the same proportion, and then it would make no difference.

IX. PAIN AND SICKNESS.

SUPPOSE you tear the skin upon your hand, do you feel it? How does it feel? Does it hurt you if you cut your hand? In what other ways can you hurt your hand? By striking it against any thing very hard, by burning it, or making it very cold. Did you ever hurt your hand? How?

Do you think it would be better for you if these things did not hurt your hand? What advantage would there be to us in having our body made so that it could not feel pain? The advantage would be that, were we to cut ourselves, or fall down, or fall in the fire, then we should not suffer any pain.

Does it hurt children to tear their clothes? Does it hurt them to pinch, or burn, or freeze their clothes? Which are children generally most careful not to injure in this way, their clothes or

their flesh? Why are they more careful not to tear their hands than their clothes?

What disadvantage, then, would there be in having our bodies made so as not to feel pain? We should probably tear and spoil our faces and hands as carelessly as we now do our clothes. But as it is, the pain which we feel when our face or hands are injured makes us take better care of them.

Why is it of less importance to take care of our clothes than of our bodies? Because, when clothes are torn, we can have them mended, or we can put on others.

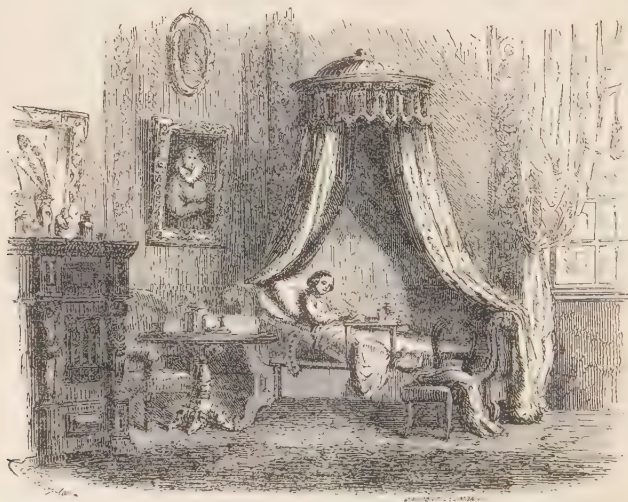
Suppose one of your hands should be broken or torn so as to be spoiled, could you have a new one? No, you could not. If any person's leg is taken off, can he have any kind of leg made instead? Yes, he can have a wooden one. Do you think that a wooden leg would be a good one to walk with? No, not very good, but it is better than none at all, and he can walk tolerably well with it.

Sometimes, when men lose their hand, they have an iron hook made instead, and have it fastened to their arm. Can you think of any thing which a man could do with a hook fastened to his arm? He could carry a pail of water with it.

Suppose it should be torn a little, could any body mend it? Would it always remain torn? No; it would slowly heal of itself. How would it feel while it was getting well? It would feel sore.

Can you think of any advantage in having it feel sore until it is well? It makes me take care of it, and keep it wrapped up, and not knock it against any thing, and thus it gets well sooner.

Here is a picture of a boy that fell from a ladder and broke his leg.



His leg is bandaged up, and it is getting well. While he keeps still it is getting well, but if he should try to walk about on it, it would not get well at all. So he is lying still in his bed, and amusing himself with playthings as well as he can till his leg gets well.

What makes him willing to lie still in bed, and not walk about on his leg? It is because it hurts him so much if he tries to walk. So he is willing to lie still.

What a pretty room he has got! and how many books! He has a little table, too, fitted over his bed, to put his playthings on.

Do you suppose that when his leg gets entirely well, he can then walk about on it without its hurting him?

Does the pain of every hurt go away when the hurt is well?

Do all parts of your body feel pain? Think of some parts of your body which do not feel pain. The hair does not, and the nails do not. Why is it better that the hair should not feel pain? Because it is so slender and so much exposed that it would be always getting hurt if it were made sensible to pain.

Is it as necessary to avoid burning or cutting the hair as the hand? No; because the hair, when it is burned off or cut off, grows again immediately.

Why is it better that the nails should not feel pain?

Do animals feel pain? How do you know? Is it right or wrong to put animals to pain unnecessarily? When is a person sick? When some part of his body within is disordered. Do we feel pleasure or pain when we are sick? We feel pain, or, at least, we feel unpleasantly.

What advantage is there in feeling unpleasantly when we are sick? We are more willing to take care of ourselves, to avoid getting cold, and to take medicine so as to get well.

There is another advantage of feeling unpleasantly when sick; can you think what it is? It makes us take better care of ourselves when we are well, and so not get sick.

Is it often our own fault that we are sick? In what ways may we bring sickness upon us by our own fault? By eating too much, or eating wrong things, or by going out in the wet.

Does the unpleasantness of sickness cause us to be more careful not to make ourselves sick?

Is sickness always our own fault? Would it not be better if we were so made as never to feel sick? No; for sickness makes us feel our dependence upon God, and reminds us that we must die.

DIVISION IV.

ANIMALS.

I. KINDS OF ANIMALS.

THERE are a great many different kinds of animals. I will tell you the names of the different kinds. There are beasts, birds, fishes, reptiles, and insects.

What is the difference between a beast and a bird? Birds are made to fly in the air, and beasts to walk on the ground. Besides, beasts have four legs, but birds have two legs and two wings.

Here is a picture of a beast and of a bird.

You can see that the beast has four legs and the bird only two.



Can you see one of the bird's wings? The other is round on the other side.

What is the difference between birds and insects? Insects are much smaller than birds, and have no feathers. Flies are insects, and so are bees, and ants, and butterflies, and other such animals.

What is the difference between beasts and reptiles? Reptiles crawl or hop along the ground. A snake is a reptile; so is a toad; but a horse or a cow is a beast.

Here is a picture of a reptile.



Don't you see him crawling along? It is a lizard. He lives in wet places, and crawls along on the ground. He has not any hair or fur on his back, but his skin is smooth and bare, like a frog's skin.

Is a butterfly a bird or an insect? Why? What is a

swallow? What is a fly?

What is an elephant? A beast.

Which animals are the prettiest, birds or fishes?

Can you think of any reason why birds are made to be more beautiful than fishes? Which do we see oftenest? We see the birds oftenest, and perhaps that is the reason why they are made to be more beautiful.

II. CLOTHING OF ANIMALS.

HAVE all animals the same clothing?

What is the clothing of birds? Feathers. Of fishes? Scales. Of insects? A very fine down, which looks like dust. Of beasts? Hair, and sometimes wool.

Which should you think would be warmest, hair or feathers?

Why should birds have warmer clothing than beasts? Because they are smaller and more delicate; besides, they have to fly swiftly through the cold air.

Do you see many birds flying about in the winter? No; they fly away into warmer countries before it becomes very cold, and come back in the spring. Don't you think it is very strange that they should be able to find the way?

Are there any birds to be seen in the winter? What kind of birds? Snow-birds. Why are they called snow-birds? Because we generally see them hopping about on the snow.

What do you think the snow-birds can find to eat? They find little seeds lying on the snow, and the eggs of insects on the trees, and on the sides of the fences. Then, besides, sometimes kind children see them, and they bring out little crumbs of bread and scatter before them. The snow-birds like little crumbs of bread.

Are all feathers alike? Did you ever see white feathers? What bird did you ever see that had white feathers? Did you ever see any red feathers on any bird? What bird? Did you ever see any green feathers? Any black feathers?



Some birds have very long feathers. Here is a picture of two curious wild birds. They are standing on the branches of a tree.

What long tail-feathers! They have both got long tail-feathers, but the one that is on the highest branch has very long tail-feathers indeed. I wonder what such a long tail can be for!

What birds are there that have feathers of

many colors? Hens and peacocks.

Is the clothing of beasts always hair? No; it is sometimes wool and fur.

What is the difference between hair and wool? Hair is straight, but wool is curled, and the fibres are twisted together. What is the difference between hair and fur? Fur is the finest and softest.

Which have the warmest hair or fur, small animals or large? Small animals, because they are more delicate, and so need the finest covering.

Which should you think would be clothed the warmest, the animals which live in cold countries or warm?

The animals that live in the coldest countries have the softest and warmest fur, and so people go into cold countries to catch animals to get furs to make muffs and tippets of.

Do hair and feathers do any other good besides keeping animals warm? Yes; they cause the rain to run off, and so keep the skin dry. Which does this best, hair or feathers? Feathers.

Do animals dislike to be wet? How do you know? They almost always run under some shelter when it rains.

What is the clothing of fishes? What are scales? They are



little flat things, lapping over each other, all over the fish. Here is a picture of a fish. Do you see the little scales? Do you see how they lap over each other? What shape are the scales?

They are nearly round. Are they hard or soft? Hard. Are they to keep the fishes warm? No; fishes are not warm; they are always as cold as the water that they swim in. Do they not suffer, then, when the water is cold? No; they are made so as not to feel cold.

Are the scales then intended, like the feathers of birds, to keep the fish from being wet? What then are they for? They are to keep the fish from being injured by rubbing against the rocks under the water, and sometimes from being hurt by other fishes. Are the scales of all fishes of the same color?

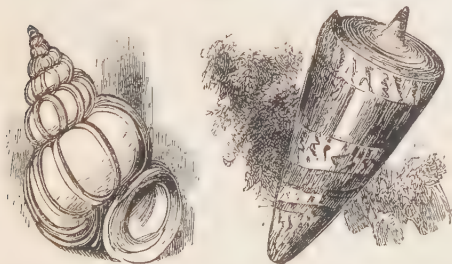
Have reptiles any need of warm clothing? No; for they do

not generally feel the cold. Do they usually have any clothing? Yes, they often have scales like fishes. Have all reptiles clothing? No, some are naked. Have toads and frogs any clothing? Did you ever look at a toad to see whether he had any hair, or fur, or scales, or feathers?

Have insects need of any warm clothing? Why not? Because they only live in the summer when it is warm enough for them.

Have they clothing for any purpose? Yes, they are covered with a little soft down. Of what use is the downy clothing? It causes the wet to run off easily. If we drop a little water on the butterfly's wing, we shall see that it will roll off without wetting him.

Can you think of any other kind of clothing besides those which have been mentioned? Yes, some animals have a hard shell. What animals? Lobsters, and turtles, and clams, and many others. Some of these shells are very beautiful. See! here are two beautiful shells. What pretty shapes! One of them looks like a top. I wonder whether it would spin!



The animals live in these shells, only they come partly out when they wish to crawl along. Can they come entirely out, and so go away and leave their shell? No, they can not, for the shell grows to them.



Here is a picture of a snail crawling along with his shell on his back. Part of his body goes up into his shell. He can draw his whole body back into his shell if he wishes to do it. I have seen a picture of a boy

poking at a snail with a stick to make him come out. But that is not the way to make him come out. That is the way to make him stay in. The way to make him come out is to stand still and watch him, and not make the least motion or noise.

What do you think is the use of the shell? Do you see the snail's eye?

Do men make any use of the clothing of animals? Yes, they make cloth for themselves out of it. Do men make any use of the hair of animals? Yes, they make brushes, and mattresses, and violin bows, and coverings for sofas, and a great many other things.

Do they make any use of fur? What use? What animals are there whose hair and fur is of use?

Do men make use of wool? Yes, they spin it into yarn, and then weave it into cloth and make clothes of it. Why do they not make cloth of fur as well as of wool? Because the fibres are not long enough to spin together and make a thread. The fibres of the wool are very long, and they curl together and entwine among themselves, and so hold together when they are spun into yarn.

Here is a picture of a sheep. See his wool! See how soft and warm it looks! If you could feel of it, you would find that it was all twisted and twined together, and that is the reason why it will spin.



How do people get the wool off the sheep when they wish for it? They lay him down, and then cut it off with shears.

Do men make any use of feathers? What use? What birds are those whose feathers are most used?

Why are the feathers of geese used more than those of other birds? Because the feathers are larger and better than those of most other birds. Why are the feathers larger? Because the geese themselves are larger.

Are there no other birds as large as geese? What birds? Eagles and vultures.

Why not use their feathers? Because it is much more difficult to tame and keep these birds; and when they are wild, it is very difficult to catch them.

Do men ever make use of the scales of fishes? No. Do they ever make use of the shells of shell-fish? What use? They make ornaments of them sometimes.

III. FOOD OF ANIMALS.

Do all animals have the same food? What food do birds live upon? They generally live upon the seeds of plants. Where do they find the seeds? They find them growing in the fields.

How can they pick up the little seeds? They have a long, slender bill, which is made on purpose for this. Here is a picture



of some birds picking out the seeds from the heads of the stalks where they grow.

Do all birds live on seeds? No, some live on the flesh of other animals. Are the bills of birds that feed on animals different from those of the birds that live on seeds? Yes, they are very strong and hooked, so that the birds can pull the flesh to pieces easily.

Is any other part of the bodies of such birds different? Yes, such birds have strong and sharp claws. What are such birds called? Birds of prey.



Here is a picture of a bird of prey. Do you see his strong and sharp claws? He has caught a rabbit, and now he is going to tear it to pieces and devour it.

Is a robin a bird of prey? No, the robin lives on seeds, and on crumbs of bread, and berries.

Is the eagle a bird of prey? Is a humming bird?

What is the food of horses? Of sheep? Of cows?

What part of the body of these animals is made on purpose to enable them to take their food? They have large flat teeth, to crop the grass and to chew it.

Would it be well for horses and cows if they had long, slender

bills like the birds? Why not? Because they could not eat grass with such beaks. Would it be as well for birds if they had mouths like those of horses and cows? Why not? What is the food of squirrels? Nuts and acorns.

Do you know whether there are any beasts of prey as well as birds of prey? Yes, lions and tigers are beasts of prey, and so is the cat. The cat preys upon mice.



Beasts of prey have sharp claws and sharp teeth to tear their prey to pieces with. Here is a picture of a leopard. See how fierce he looks! He is crouching down, just ready to spring upon his prey.

Would it not be as well for the cat if her feet had hoofs like the horse's? Why not? Because then she could not catch her mice.

What does the pig like best to eat? Roots. Is any part of his body made on purpose to dig roots? What part? His snout.

Could the pig dig roots with a mouth like the horse? Could he do it with a bill like a bird?

Could a horse eat grass if he had a bill like a bird? Not very well, and yet a goose can eat grass by means of its bill.

Some birds live on fishes. They wade about in the water, and catch fishes in their bills. Here is a picture of a bird called a pelican. See what a great bill! There is a sort of bag or pouch on the under side of it where the pelican keeps his fishes when he has caught them.



Farther back is another pelican that has just caught a fish. See! He is just taking the fish into his bag. His bag is already nearly full.

The nearest pelican is standing on a rock. See! He is looking at you and me. He is watching us. He has not any fishes in his bag. Pretty soon I suppose he will go down to the water and catch some. When he gets his bag full I suppose he will fly away to his nest and give the fishes to the little pelicans.

What is the food of insects? Generally the juices of plants and flowers. How do they obtain these juices? They have a long hollow pipe coming out from their mouths, and they suck up the juice through this.

What is this little pipe called? A proboscis. What do they do with this proboscis when they are not using it? They roll it up or fold it up.

Can you see this proboscis upon any insects? Yes, in the fly,

and the butterfly, and the miller. Why must this proboscis be long? So as to reach down into the flowers.

Can you tell me why bees, and butterflies, and millers fly about from flower to flower in the fields on a summer's day?

IV. HABITATIONS OF ANIMALS.

WHAT are the habitations of men? Houses. What are the habitations of birds? Nests. What do we mean by their habitations? We mean the place they live in.

Who makes the habitations of men? Who makes those of birds? The birds. Where do birds build their nests? What do they build them of? Straw and clay. How can they carry the straw and clay about? In their little bills.

What do men make their habitations of? They make them sometimes of timber and boards, and sometimes of bricks, and sometimes of stone. How do men bring the timber and boards, and the bricks, and the stones, to the places where they are going to build their house? They put them upon carts, and then they have horses or oxen to draw them.

How do they get the timber and boards? They saw them out of the trunks of great trees that grow in the forests. How do they get bricks? They make them of clay. They shape the bricks when the clay is wet and soft, and then they burn them hard in a kiln. How do they get stones? They dig them out of the ground.

Where do birds build their nests? Sometimes in the trees, and



sometimes on the ground. Here is a very pretty picture of two birds building a nest up among the branches of a tree. They have got the nest almost done.

Have you ever seen a bird's nest? Are all nests alike? What is it that birds keep in their nests? First, their eggs, and then their little birds. Which is the softest and smoothest, the inside or the outside of a bird's nest?

Can you think of any other animals which make themselves habitations?

Do any other animals besides birds make themselves habitations? Does the horse? No; men make the habitations for horses. They make barns. Does the sheep make himself a habitation? Does the ant? Does the bee? Does the fly? Does the mouse?

What is the habitation of the ant? How do the ants make their nests? They dig into the ground by bringing up one grain of sand at a time. How do they bring it up? In their mouths. Where do they put the grains of sand? They pile them up about the outside of the hole.

Have you ever seen any ants making their nests? What do they keep in their nests? They lay up food for the winter, and they keep their young ants there.

Do birds lay up food for the winter in their nests? Why not? Because they have wings, and so they can fly away to countries where it is warmer.

What is the habitation of mice? How do they make their holes? What do they keep in their holes? Do their holes do them any other good? Yes; they run into them when there is any danger.

What is the danger that mice avoid by running into their holes?

What is the habitation of the spider? Who makes the spider's web? How does she make it? She spins the long threads from her body. How does she fasten the ends? With her feet.

Did you ever see a spider spinning her thread? How can we contrive to see her? We could place a spider upon a stick, and see her fasten her thread upon the end of it, and then let herself down by it. Is the thread strong enough to bear the whole weight of the spider? Is it coarse or fine?

Of what use is the web to the spider? It catches flies and other insects. Why does the spider wish to catch flies? How does the web catch them? They fly into it and become entangled.

Does the spider ever become entangled in her own net? Why

not? It must be because the feet and legs of the spider are made differently from those of the fly.

Do you know what the difference is? Can we not tell by examining very closely? No, we can not, because the legs of both are so small that we can not see them distinctly.

What is the habitation of the bee? The hive. Who makes the hive for the bee? Men make it.

What do men make bee-hives of? Hives are sometimes made

of wooden boxes, and sometimes they are made of straw twisted like a rope, and then wound round and round. You will see what sort of hive this makes by the picture.

Do you see the hives? How many are there? Do you see the bees flying



about? Do you see the flowers? Do you think it is a good plan to have flowers round a bee-hive?

What do bees make in their hives? They make honey and honey-comb. What is the comb made of? What is it for? Why do bees make honey? They make it to eat in the winter when there are no flowers. Why do not they fly away like the birds to warm countries where there are flowers? Because they are too small to fly so far.

Why do men make habitations for horses, and bees, and hens, rather than for any other animals? Because they are useful animals to men. What is the use of the horse to men? What is the use of cows? What is the use of the hens? Of the bees?

Do any animals go without habitations? Yes, fishes. Do not fishes have any habitations at all? I believe not.

V. MOTIONS OF ANIMALS.

Do all animals move from place to place? What limbs do horses use in moving from place to place? They use their legs.

Can horses run very fast? Yes, they can go very fast indeed. Here you see two horses running about the pastures. See how



swiftly they go, with their manes and tails flying in the wind! Away off, as far as we can see, there are more horses galloping

away. Do you see them? You must look under the nearest horse to see them.

What do birds use in moving from place to place? Sometimes they fly with their wings, and sometimes they hop along on the ground by means of their feet.

Have horses more than one way of moving from place to place? Have birds? How do birds move through the air? How do they move upon the ground? In which way can they move fastest, by their legs or by their wings?

Which can move fastest, a horse or a bird? A bird can fly much faster than a horse can run.

Can fishes move from place to place? What limbs do they use?



They use their tails and their fins. Here is a picture of two fishes lying in the grass. Do you see their tails and their fins?

What is a fin? It is a sort of little paddle that grows out of the side of the fish. Why is it made broad and thin? So that the fish

can paddle with it easily.

Do fishes move swiftly or slowly through the water? Very swiftly.

How do worms and snakes move from place to place? They crawl. Do they use any limbs in crawling?

Do you understand how they can crawl? No, it is very difficult

to understand. Do they crawl swiftly or slowly? They generally crawl slowly.

How many ways have flies of moving from place to place? They can walk and they can fly. In which way can they move fastest?

Can flies go up the side of a wall? Why do they not fall off? Their feet are made so as to enable them to hold on. Can any other animals walk up in this way? What animals? Caterpillars and musquitoes.

Are the wings of flies like those of birds? What difference do you see between them?

How do birds and insects fly? They strike the air with their wings, and thus raise themselves up.



This is the way a bird always holds his wings when he wishes to fly up.



And this is the way the bird holds his wings when he wishes to fly down.

How are the wings of butterflies formed? They are very broad, and flat, and thin. Why are they made so? They are broad and flat so as to strike the air more perfectly; and they are made thin so as to be light. Why is it necessary that they should be light?

Are the wings of a fly broad and thin? Are they shaped exactly like those of the butterfly? What difference do you think there is?

Are the wings of birds formed in the same way? No; they are formed of large, strong feathers, which lie over each other.

Why should the bird's wing be different from that of an insect? Because the bird is much larger and heavier, and she requires a stronger wing.

What are the strong feathers that form the wing called? Quills. Did you ever see a quill? Why are they made to grow hollow? So as to be strong but light.

Can ducks and geese fly? Can they walk? Can they swim? What limbs do they use in walking? What do they use in flying? What in swimming? Which do they like to do the best? They do not like to fly much; they prefer to walk on the ground, or to swim about on the water.



How does the duck use his feet to swim with them? He pushes them against the water, and thus pushes himself along. Here you see the duck swimming. Don't you see how he has pushed his foot backward against the water in order to propel himself along? He is looking down into the water. He thinks he sees something

there that is good to eat, and he is swimming after it.

The duck is web-footed; that means that his foot is formed with a web, which makes the foot a sort of paddle. The goose is web-footed. All animals that are meant to swim are web-footed.

Is the hen web-footed? Did you ever see a hen swimming? No; a hen can not swim. She is not web-footed.

Are any animals web-footed besides the goose? Yes, a great many that live upon ponds and marshes, and upon the shores of the sea.

Do web-footed animals generally have long necks? Yes, they do.



Do you think that all animals that live about the water are web-footed? No, they are not all web-footed, for some animals that live about the water are meant to wade in it, and not to swim, and so they do not need paddling feet. Here is a picture of a plover. See what long legs! He is made to wade and not to swim, so you see he has not got any paddling feet. He does not need to swim, for his legs are so long that, when he goes into the water, he can wade about it on the bottom.

How does a frog move from place to place? He hops. Has a frog more than one way of moving? Yes; he can hop upon the land, and he can swim in the water. In which way can he move the fastest? He can move fastest by swimming.



Here is a picture of a funny-looking animal. It is a crab. See what a funny shape, and what funny legs! The crab runs about every way, backward and forward. He has a shell on his back, and curious claws. Would you like to see a picture of him larger and plainer? Then turn over the leaf.

Here he is. Don't you see him large and plain?



What large claws!
What funny legs! If you could only see that crab running about, backward and forward, with his funny legs, you would laugh. I think you would be afraid of him, but I am sure that, if you were not afraid of him, you would laugh.

VI. PROTECTION OF ANIMALS.

ARE animals ever in danger? What animals? The mouse, the fly, the bee are often in danger.

In what danger is the mouse sometimes? He is in danger that the cat will catch him. In what danger is the fly sometimes? In what danger are the bees? They are in danger that somebody will come and steal their honey.

In what way can a mouse avoid his danger? He can run into his hole. Can all animals escape into holes when they are in danger?

What animals can not? A horse can not, nor a cow, nor a bird, for a bird has no hole.

Can any animals escape by running or flying away without going into holes? What animals? The fly, birds, and the cat.



Can the cow escape easily by running or flying away? Why not? Because she can not run fast. Look at these cows in the picture, and see if you think they can run away fast if they are in danger. How many

cows are there? How many are lying down? How many are standing up?

Has a cow any way of defending herself? What way? She can defend herself by her horns.

Have you ever seen a cow attacked by any animal? What animal? A dog. Did she run away, or did she turn round and try to defend herself with her horns?

Do cows ever live wild in the woods? Yes, in some countries. Should you think they would be often attacked there? Yes, by wild beasts.

Do horses ever live wild in the woods? Do dogs? Have dogs any means of defending themselves when attacked? What means? They have claws and teeth. Have they the power to run away too?

Have horses the means of defending themselves? Have they power to run away?

Can the bee fly away when she is in danger? Has she any means of defending herself? What means? She has a sting. What sort of a thing is a sting? It is slender and sharp like a needle.

Why is it necessary that a bee should have a sting rather than the fly? Because the bee has honey to take care of, and if she should fly away it would all be taken.

Do you think the honey would be more likely to be taken from hives if there were only flies to take care of it?



Do you remember a picture of some bee-hives which we saw before in this book? Here is another picture of bee-hives and bees, only these bee-hives are different from those we saw before. These are boxes made of wood. They stand on a bench. I presume they are full of honey. If any body should go there to lift up the hives and get the honey, the bees would sting them.

Has a lobster any means of defending himself when he is attacked? Can he escape by running away? Can he defend himself? His hard shell protects him.

Are animals perfectly free from danger in these ways? No, they are not perfectly defended; they are very often caught and eaten.

What animals are there which sometimes fall a prey to other animals, notwithstanding their defense? Mice are caught by cats, and chickens are caught by foxes, and sheep are caught by wolves and by bears.

Are animals always defended from men? No, men find a great many ways to take animals, notwithstanding their defences.

What animals do men take? They take bees to get their honey, and they take horses and cows, and they shoot wolves and bears. They can even catch elephants, and lions, and tigers, and shut them up in cages.

Which can run fastest, men or horses? How then do men ever catch horses to bridle them and make them work? When the horses are wild in the woods, men sometimes drive them up into pens, and so catch them. At other times they chase after them with other horses, and throw a rope round their neck with a noose in it.

How could men take cows when they were wild in the woods, notwithstanding their horns? They could take them in the same way that they do horses.

After a time horses and cows become tame, and then they like to stay with men, and feed in peace about their houses and barns.

Now see if you can remember what I have taught you. What is the cow provided with to defend herself from her enemies? What has the bee? What has the lobster? What has the horse? He can kick with his heels; and then he is very swift, and can run away.

How can the mouse save himself from his enemies? He can run into his hole. The fly? He can fly off through the air. Lions and tigers? They defend themselves with their teeth and claws.

What have men to defend themselves with against wild beasts? They have not any thing. They have no sting, or shell, or sharp teeth, or claws, or horns, or any thing of the kind, and they

can not even run away very fast. What do they do then? They contrive weapons to fight with when they wish to fight the wild beasts, and they make horses run with them when they wish to run away.

What kind of weapons do men make to fight the wild beasts with? Some savage people fight the wild beasts with spears, or bows and arrows, but civilized people use guns. Why are guns better than bows and arrows? Because a gun will throw a bullet much farther than an arrow can be thrown by a bow. Besides, a gun can be aimed better.

What is a spear? It is a sort of pole with a sharp iron at the end of it.

Opposite is a picture of wolves chasing some travelers. Don't you see the wolves? They look like dogs, but they are not dogs. They are fierce and furious wolves. The men are in a sleigh. The horses are running as fast as they can go. The wolves are making for the horses. The horses are terribly frightened. They hear the howl of the wolves, and they are dreadfully afraid.

If the wolves can catch the horses, they will spring up and seize them by their throats, and kill them. Then the wolves will fall upon the travelers and devour them.

What is that which one of the travelers has in his hand? It is a pistol. He is going to shoot the wolves. He is just this minute firing at them. I can see the flash of the pistol.

I hope he will kill the wolves. But if he does not kill them, he must load his pistol again as soon as possible, for I see more wolves coming over the hills. They are running across so as to get before the travelers, and thus head them off from their road.

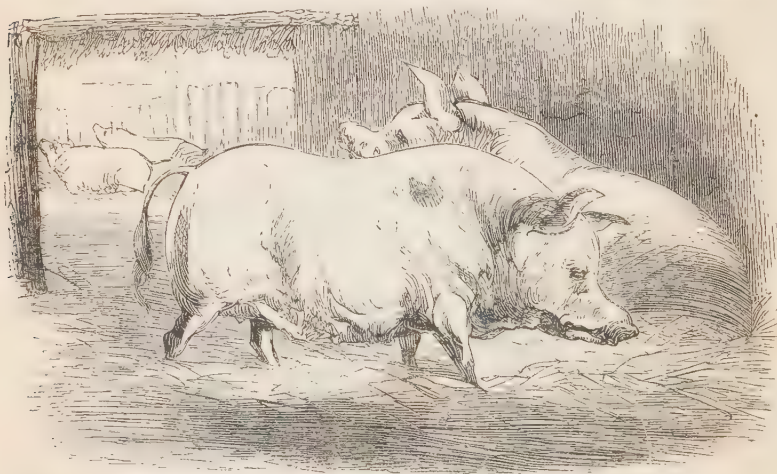


It seems to be winter in this picture. Don't you see that the trees are bare, and that there is snow upon the ground?

VII. ANIMALS USEFUL TO MAN.

THERE are a great many different kinds of animals that are useful to man. He uses them for different purposes.

Here, now, are some pigs — two large, fat pigs very near, and



two more farther back. These pigs are shut up in a pen. Do you know what men keep pigs for? They keep them to let them grow fat, and then to kill them and make meat of them.

Do you see that these pigs are shut up in a pen? Part of the pen is open to the sky, so that the pigs can go out and walk about, and take the air. Part of it is covered over with a roof, so that

Here is another picture of some trees growing, and there is a woodman cutting them down. He has just felled one of the trees, and now he stands by it, with his foot upon it. Don't you see his axe? He is stopping to rest? It makes him tired to cut down such a big tree. He has taken his coat off so that he can swing his arms more easily. Workmen generally take off their coats when they are at work.



The axe must be very sharp to cut down large trees. The men make it sharp by grinding it on a grindstone. This is the way they do it. One man turns the grindstone, and the other holds the axe upon it. The grindstone turns round and round, and the roughness of the stone wears the steel away on the sides of the axe, and that makes the edge sharp. The woodman can cut down the trees much faster if his axe is sharp.



What things in this room are made of wood? Of what kind of wood are they made?

Are the stems of small plants of any use? Of what plants? Straw, and hemp, and flax. What do men do with straw? What do they do with flax? What do they do with hemp? They make ropes of it. Why do they not make cloth of it as

they do of flax? Because it is too coarse. They do sometimes make cloth of it, but generally they make ropes of it, it is so coarse and strong.

Are the juices of plants of any use to men? Yes; a great many things are made of juices of plants. Sugar is made of the juice of the maple-tree or of the sugar-cane. India-rubber is made of the juice of a plant. So is pitch.

What are the juices of trees called? They are called the sap. How do they get the sweet sap out of the maple-trees to make the sugar? They bore a little hole in the side of the tree, and put in a plug with a hole through it, and the sap comes dropping slowly out.

How do they catch the sap? They catch it in buckets placed underneath. How do they make the sugar? They boil the sap in great kettles, and that boils the water away and leaves the sugar.

III. LEAVES.

WHAT else is there that belongs to plants besides the roots and the stem? The leaves, and the flowers, and the fruit.

Are all leaves of the same shape? What shape are the leaves of grass? They are long and slender. What color are they? They are green. What makes the fields look so green in summer? It is because the ground is covered so thick with the little, long leaves of the grass.

What good does the grass do that grows in the fields? The sheep and the cows feed upon it. They walk about the fields and



eat the grass, and have a very good time. Don't you see the cows and the sheep in this picture rambling over the fields? One of the cows has got a calf.

Away off at a distance I see a flock of sheep.

There are two great trees in the picture, too, very near. But they are dead, and all the leaves are fallen off.

Are all leaves long and slender like the leaves of grass? No, there are a great many different shapes. Once I knew some children playing in a garden, and they ran about the garden and gathered leaves of all the different shapes that they could find. Some were

notched all around the edges like a saw ; some were shaped like a heart ; some were round ; some were pointed ; and some were long and slender like a needle. The children arranged all the leaves they thus found in rows on a bench, and they looked very pretty.

What plants have very large leaves ? Sunflowers, and pumpkin-vines, and rhubarb.

Can you think of any plants that have very small leaves ?

How are leaves fastened to the branches of the tree ? By little stems.

Here you see a picture of a little branch, to show you how the leaves are fastened to it. Do you see the little stems ?

There are some pretty flowers, too, growing on this branch. There are three flowers and two buds, and one bud that is just opening. Which of all of these would you rather have ?

What is the general color of leaves ? Are they always green ? No ; in the fall they turn yellow and brown, and then fall off.

During what part of the year are the branches of the trees without leaves ? Do all trees lose their leaves in the winter ? What trees do not ? The pine, and the hemlock, and the fir, and



many other similar trees. What are such trees called? Evergreens.

Why are they called so? Because they continue green all the year.

In what countries are evergreens most abundant? In cold countries, where the winters are long, and the fields would look dreary if the leaves were bare.

Here is a picture of evergreen trees growing in a cold and dreary



country. Some of them are fir-trees. The pine-trees are those in the corner on the left side. Do you see them? The fir-trees are

the pointed ones that stand scattered about. Do you see the fir-trees?

Can you think of any reason why the leaves of some trees should fade, and die, and drop off, while those of others should remain green and continue upon the tree? I don't exactly understand the reason. I think it is very curious.

What becomes of the leaves that drop off from trees in the fall? They are driven about by the winds till they decay and mix with the ground.

Where do the new leaves come from in the spring of the year? They grow out from the little branches.

How do they appear at first? They are little buds at first. Do these buds contain the new leaves? Yes; and, when the weather grows warm, the leaves come out.

At what time in the year can these buds be seen? In the winter. What change takes place in them in the spring? They first begin to grow and swell, and soon after they open, and the leaf grows out.

In what months do the leaves generally grow out? In May and in June. Do the leaves of all trees grow out at the same time? No; some leaves come out early, and some late.

What trees or plants put forth their leaves early? The willow leaves come out very early.

Of what use are the leaves to the plant? They spread themselves out to the air, and draw from it some nourishment, which goes down the stem into the plant, and makes it grow.

How can we prove that leaves are useful to plants? If we pull the leaves all off, the plant will die.

Do you think the country looks prettier in the summer on account of the leaves on the trees?

Are the leaves of any plants of any other use? Some leaves are. What leaf is there which is very commonly used by almost all families? The tea-leaf. Tea consists of little leaves rolled up. They are the leaves of the tea-plant. Does the tea-plant grow in this country? In what country does it grow?

How are the leaves brought over to this country? In ships on the sea.

Are there any plants in the garden which are cultivated principally for the leaves? Yes; sage, and peppermint, and other herbs.

If you wish to make a collection of leaves of all kinds, you can keep them very well by pressing them between the leaves of a book.

IV. FLOWERS.

WHAT else is there belonging to plants besides roots, stems, and leaves? Flowers. What is there remarkable about flowers? They are very bright and beautiful.

Are all flowers of the same color? How many colors do you recollect to have seen in flowers? Are all flowers of the same shape?

Think of two or three flowers that are very different in shape?

Are all flowers of the same size? What flowers are very large? What flowers are very small?

Do flowers have a stem for themselves, or grow upon the same

stem with the leaves? They generally have a little stem to themselves.

Does more than one flower grow upon a stem? Sometimes only one, and sometimes a great many.

Do you know how flowers grow? I will tell you. First there comes out a little bud. The little bud is covered over usually with small leaves, green and brown. These are called leaflets. Leaflets means little leaves. The green and brown leaves that cover the bud are very small.

When these leaflets have opened, then the flower comes out. It has pretty colored leaves all around, and a great many curious little things growing out of the middle of it.

If you cut open the middle part of the flower—the part that all these curious little things grow out of, you will sometimes find some very little seeds just beginning to grow.

What do you think is the use of flowers? They have a great many uses. The principal use is to make the little seeds grow. The seeds are always in the bottom of the flower, and the little slender things that grow up out of the middle of it reach down to the seeds and make them grow. This is very curious.

What other good do flowers do. They are beautiful to look at, and so they make the fields, and yards, and gardens look pretty, and give us a great deal of pleasure to see them.

Besides this, the bees get something out of them. What is it that the bees get out of them? Do you think it is wax or honey? No, it is not exactly wax and honey that they get, but something that they make wax and honey from.

V. FRUIT.

Do all plants bear fruit? See if you can think of any plants and trees that produce useful fruits.

How does the apple look when it first begins to grow in the spring? It is a very small bunch in the middle of the blossom, not much larger than the head of a pin.

How does it grow? The juices which are proper for making the apple come up from the roots through the tree, and down from the leaves, and pass through the stem into the little apple, which swells and grows slowly until it is of full size.

Does all of the apple then pass through the little stem? The apple does not come up whole through the stem. It could not do that, but all the substance of the apple comes up through the stem, and then is formed into the apple afterward. What is there in the middle of the apple? Seeds.

Is an apple good to eat while it is growing? No, it is not. How does it taste? It tastes sour.

Why is an apple made to be sour and unpleasant before it is ripe? Because fruits that are unripe make persons sick, and if the apple is sour, it will not be so likely to be eaten.

Would it not be better if green fruit was made so as not to cause people to be sick? No; for if fruit was pleasant and wholesome while it was small, it would be eaten before it had time to grow, and so the seeds would never be ripe. Besides, it is better to leave the apples on the tree till they are fully grown.

Is any fruit protected from being eaten in any other way while

it is growing than by being sour and hard? Yes; chestnuts are protected by a shell, and by prickly burrs.

What becomes of this burr when the fruit is ripe and ready to be eaten? It cracks open, and the nuts fall out.

How is the walnut protected? The cocoa-nut? The peach?

What is upon the outside of the apple? The skin. What is the skin for? It is a hard and tight covering, and keeps the inside of the apple from being wet or injured in any way. It is so smooth that the water flows off from it immediately.

Where do the particles out of which the skin is formed come from? They must come up from the tree, and through the stem, into the apple.

Is all the apple except the skin and the stem good to eat? What is there in the centre? The core.

How is the core formed, and what is it for? It consists of four or five little bags placed in the middle to hold the seeds.

Does the core make the apple more or less pleasant to be eaten? Would it not be better if apples grew without cores? Why not? Because then there would be no seeds, and so there could be no new apple-trees.

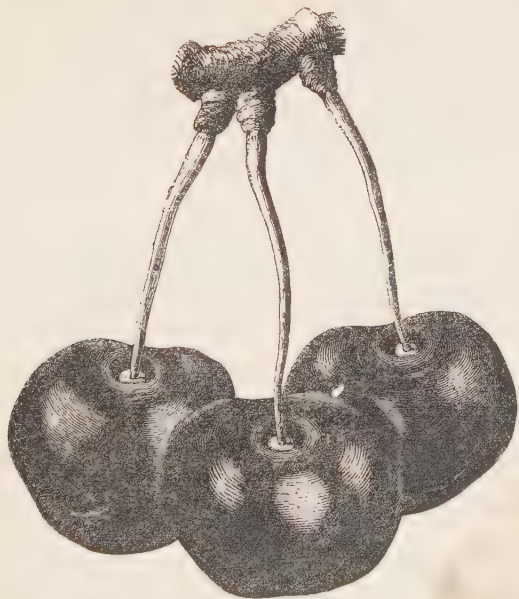
Has the orange any skin? Is it like that of the apple? What difference do you think there is between the skin of the orange and that of the apple? Which is the prettiest color? Which is the smoothest?

Has the fruit of the peach a hard or soft covering? It has a very soft one.

Has the seed a hard or soft covering? It has a hard covering. The stone is the seed.

Has the fruit of the cherry a hard or a soft covering? Has the seed a hard or a soft covering?

Here is a picture of some cherries—three in a bunch. Cherries



grow in little bunches. Each cherry grows at the end of a long stem. Do you see where the stems grow out of the branch? The ends where they grow out of the branch are rough and corrugated. Corrugated means wrinkled.

Of what use are fruits to men? Do animals like fruits? What animals like to eat cherries and plums? Birds. What

animals like to eat apples? Cows. What animals like to eat acorns? Pigs.

What use do men make of apples besides eating them? They make cider of them. How do they make the cider? They first crush the apples, and then squeeze the juice out by a press.

Is the juice of any other plant used for drink? Yes, the juice of currants and grapes. Are grapes used for any other purpose? Yes, raisins are made of them. How are the raisins made? The grapes are spread out and dried, and when they are dried they become raisins.

Are all the apples and oranges which grow gathered and eaten? No, immense numbers fall upon the ground and decay. Do these do any good? Yes, they help to nourish the seed when it sprouts and grows the next spring.

Do all fruits grow upon branches of trees and plants high in the air? No; some grow on the ground, such as watermelons and muskmelons.

VI. SEEDS.

WHAT is in the middle of an apple? The core and the seeds. Of what use are seeds? They can be planted, and they will grow up into new trees.

How did the seeds get into the apple? The substance of them came up through the stem, and is formed into seeds afterward.

What is the appearance of the outside of an apple before it is ripe? It looks hard and green. How does it look after it is ripe?

It looks mellow and rosy. What is the appearance of the outside of an apple-*seed* before the apple is ripe?

Is it the outside or the inside of the seed which sprouts and grows when it is planted? It is the inside. The outside skin bursts open, and then the inside grows out. How does it begin to grow? A small sprout shoots out, part of which runs down into the ground and becomes a root, and part springs up and grows into a tree.

How does the sprout of a walnut get through the shell? The shell cracks open by the frost and the wet.

In what are the seeds of the pea inclosed? In a pod. Did you ever pull open a pea-pod, and see all the little seeds within?

Do beans grow in a pod too?

Are the seeds of the currant in a pod or in fruit? Could you find the little seeds in a currant, do you think, if you were to break one open?

Some seeds are very small—very small indeed. Poppy-seeds are very small, and so are grass-seeds. There are some seeds so very small that, if you had one of them in your hand, you could not see it.

Some seeds are very large. The cocoa-nut is a seed, and it is very large indeed. It grows on a high tree. It has a very hard shell. Did you ever see a cocoa-nut?

There is something very curious about apples when they get ripe, and that is, that the joints of the stem weaken where they connect with the branch of the tree, so that they come off very easily. Before they are ripe they cling to the tree very tight, but when they are ripe they can be shaken off very easily. The

tall girl in the picture is shaking the tree, and the ripe apples drop off. One of the children is holding her apron to catch them as they fall, and the other two are picking them up off the ground.



The apples that are not ripe cling to the tree.

Are there any seeds in raspberries? In strawberries? In figs? Yes, there are seeds in all those things, and if you look you can find them.

Do you know of any flower whose seeds are inclosed in a pod? Yes, the pea is one; and the clover is another, though the pods of the clover are so very small that you can hardly see them.

How are the seeds of a poppy inclosed? They are in the cells of a round ball, with holes in the top to let the seeds out when they are ripe, and a cap over the top to keep the rain from getting in. It is very curious indeed.

How are the seeds of corn bestowed? They are arranged

beautifully in rows round and round the cob, which is in the centre. See how regularly they are arranged in rows!

When it is growing, the corn is covered with husks, as you see in the lower ear in the picture, to keep out the wet, and also to prevent the squirrels and field-mice from eating the kernels before they get ripe.

At last, when they

get ripe, the husks open, and then the squirrels and field-mice can eat as many as they want.

At the top of the ear of corn is a little tassel of green and silky threads.

Has the rose any seeds? Yes. Is there the same number of



seeds in every plant? No, indeed; some have a great many more than others.

Do you know how many seeds there are in an apple? Would you like to count some day?

How many are there in a peach? What is the seed of the peach? How many are there in an orange? How many in a chestnut burr? Three.

Sometimes the seeds from a flower or a tree drop down upon the ground, under the flower or tree, and sprout and grow there, and sometimes they are carried away by animals and dropped in distant places, and sometimes they are scattered about by the winds.

How can the winds blow about any seeds? Some seeds have a sort of feather growing to them by which they are blown about. You can see this in the thistle and dandelion. Did you ever see a thistle-seed or a dandelion-seed flying through the air?

Are seeds of any use to animals? Yes; many animals live upon them. Many birds live upon grain, such as wheat, corn, and other seeds. Many animals, too, eat nuts and acorns, which are seeds.

Can these animals obtain nuts and acorns during all the year? No, only in the autumn.

Then what do they do for food during the winter and spring? They treasure up nuts in holes in the ground and in hollow logs, and thus always have some to eat. They gather the nuts and put them in their holes in the fall of the year.

Are seeds of any use to men? What seeds are most useful to men? The seeds of wheat, and rye, and barley, and corn, and all

Here is another picture of some trees growing, and there is a woodman cutting them down. He has just felled one of the trees, and now he stands by it, with his foot upon it. Don't you see his axe? He is stopping to rest? It makes him tired to cut down such a big tree. He has taken his coat off so that he can swing his arms more easily. Workmen generally take off their coats when they are at work.



The axe must be very sharp to cut down large trees. The men make it sharp by grinding it on a grindstone. This is the way they do it. One man turns the grindstone, and the other holds the axe upon it. The grindstone turns round and round, and the roughness of the stone wears the steel away on the sides of the axe, and that makes the edge sharp. The woodman can cut down the trees much faster if his axe is sharp.



What things in this room are made of wood? Of what kind of wood are they made?

Are the stems of small plants of any use? Of what plants? Straw, and hemp, and flax. What do men do with straw? What do they do with flax? What do they do with hemp? They make ropes of it. Why do they not make cloth of it as

they do of flax? Because it is too coarse. They do sometimes make cloth of it, but generally they make ropes of it, it is so coarse and strong.

Are the juices of plants of any use to men? Yes; a great many things are made of juices of plants. Sugar is made of the juice of the maple-tree or of the sugar-cane. India-rubber is made of the juice of a plant. So is pitch.

What are the juices of trees called? They are called the sap. How do they get the sweet sap out of the maple-trees to make the sugar? They bore a little hole in the side of the tree, and put in a plug with a hole through it, and the sap comes dropping slowly out.

How do they catch the sap? They catch it in buckets placed underneath. How do they make the sugar? They boil the sap in great kettles, and that boils the water away and leaves the sugar.

III. LEAVES.

WHAT else is there that belongs to plants besides the roots and the stem? The leaves, and the flowers, and the fruit.

Are all leaves of the same shape? What shape are the leaves of grass? They are long and slender. What color are they? They are green. What makes the fields look so green in summer? It is because the ground is covered so thick with the little, long leaves of the grass.

What good does the grass do that grows in the fields? The sheep and the cows feed upon it. They walk about the fields and



eat the grass, and have a very good time. Don't you see the cows and the sheep in this picture rambling over the fields? One of the cows has got a calf.

Away off at a distance I see a flock of sheep.

There are two great trees in the picture, too, very near. But they are dead, and all the leaves are fallen off.

Are all leaves long and slender like the leaves of grass? No, there are many different shapes. Once I knew some children playing in a garden, and they ran about the garden and gathered leaves of all the different shapes that they could find. Some were

notched all around the edges like a saw; some were shaped like a heart; some were round; some were pointed; and some were long and slender like a needle. The children arranged all the leaves they thus found in rows on a bench, and they looked very pretty.

What plants have very large leaves? Sunflowers, and pumpkin-vines, and rhubarb.

Can you think of any plants that have very small leaves?

How are leaves fastened to the branches of the tree? By little stems.

Here you see a picture of a little branch, to show you how the leaves are fastened to it. Do you see the little stems?



There are some pretty flowers, too, growing on this branch. There are three flowers and two buds, and one bud that is just opening. Which of all of these would you rather have?

What is the general color of leaves? Are they always green? No; in the fall they turn yellow and brown, and then fall off.

During what part of the year are the branches of the trees without leaves? Do all trees lose their leaves in the winter? What trees do not? The pine, and the hemlock, and the fir, and

many other similar trees. What are such trees called? Evergreens.

Why are they called so? Because they continue green all the year.

In what countries are evergreens most abundant? In cold countries, where the winters are long, and the fields would look dreary if the leaves were bare.

Here is a picture of evergreen trees growing in a cold and dreary



country. Some of them are fir-trees. The pine-trees are those in the corner on the left side. Do you see them? The fir-trees are

the pointed ones that stand scattered about. Do you see the fir-trees?

Can you think of any reason why the leaves of some trees should fade, and die, and drop off, while those of others should remain green and continue upon the tree? I don't exactly understand the reason. I think it is very curious.

What becomes of the leaves that drop off from trees in the fall? They are driven about by the winds till they decay and mix with the ground.

Where do the new leaves come from in the spring of the year? They grow out from the little branches.

How do they appear at first? They are little buds at first. Do these buds contain the new leaves? Yes; and, when the weather grows warm, the leaves come out.

At what time in the year can these buds be seen? In the winter. What change takes place in them in the spring? They first begin to grow and swell, and soon after they open, and the leaf grows out.

In what months do the leaves generally grow out? In May and in June. Do the leaves of all trees grow out at the same time? No; some leaves come out early, and some late.

What trees or plants put forth their leaves early? The willow leaves come out very early.

Of what use are the leaves to the plant? They spread themselves out to the air, and draw from it some nourishment, which goes down the stem into the plant, and makes it grow.

How can we prove that leaves are useful to plants? If we pull the leaves all off, the plant will die.

Do you think the country looks prettier in the summer on account of the leaves on the trees?

Are the leaves of any plants of any other use? Some leaves are. What leaf is there which is very commonly used by almost all families? The tea-leaf. Tea consists of little leaves rolled up. They are the leaves of the tea-plant. Does the tea-plant grow in this country? In what country does it grow?

How are the leaves brought over to this country? In ships on the sea.

Are there any plants in the garden which are cultivated principally for the leaves? Yes; sage, and peppermint, and other herbs.

If you wish to make a collection of leaves of all kinds, you can keep them very well by pressing them between the leaves of a book.

IV. FLOWERS.

WHAT else is there belonging to plants besides roots, stems, and leaves? Flowers. What is there remarkable about flowers? They are very bright and beautiful.

Are all flowers of the same color? How many colors do you recollect to have seen in flowers? Are all flowers of the same shape?

Think of two or three flowers that are very different in shape?

Are all flowers of the same size? What flowers are very large? What flowers are very small?

Do flowers have a stem for themselves, or grow upon the same

stem with the leaves? They generally have a little stem to themselves.

Does more than one flower grow upon a stem? Sometimes only one, and sometimes a great many.

Do you know how flowers grow? I will tell you. First there comes out a little bud. The little bud is covered over usually with small leaves, green and brown. These are called leaflets. Leaflets means little leaves. The green and brown leaves that cover the bud are very small.

When these leaflets have opened, then the flower comes out. It has pretty colored leaves all around, and a great many curious little things growing out of the middle of it.

If you cut open the middle part of the flower—the part that all these curious little things grow out of, you will sometimes find some very little seeds just beginning to grow.

What do you think is the use of flowers? They have a great many uses. The principal use is to make the little seeds grow. The seeds are always in the bottom of the flower, and the little slender things that grow up out of the middle of it reach down to the seeds and make them grow. This is very curious.

What other good do flowers do. They are beautiful to look at, and so they make the fields, and yards, and gardens look pretty, and give us a great deal of pleasure to see them.

Besides this, the bees get something out of them. What is it that the bees get out of them? Do you think it is wax or honey? No, it is not exactly wax and honey that they get, but something that they make wax and honey from.

V. FRUIT.

Do all plants bear fruit? See if you can think of any plants and trees that produce useful fruits.

How does the apple look when it first begins to grow in the spring? It is a very small bunch in the middle of the blossom, not much larger than the head of a pin.

How does it grow? The juices which are proper for making the apple come up from the roots through the tree, and down from the leaves, and pass through the stem into the little apple, which swells and grows slowly until it is of full size.

Does all of the apple then pass through the little stem? The apple does not come up whole through the stem. It could not do that, but all the substance of the apple comes up through the stem, and then is formed into the apple afterward. What is there in the middle of the apple? Seeds.

Is an apple good to eat while it is growing? No, it is not. How does it taste? It tastes sour.

Why is an apple made to be sour and unpleasant before it is ripe? Because fruits that are unripe make persons sick, and if the apple is sour, it will not be so likely to be eaten.

Would it not be better if green fruit was made so as not to cause people to be sick? No; for if fruit was pleasant and wholesome while it was small, it would be eaten before it had time to grow, and so the seeds would never be ripe. Besides, it is better to leave the apples on the tree till they are fully grown.

Is any fruit protected from being eaten in any other way while

it is growing than by being sour and hard? Yes; chestnuts are protected by a shell, and by prickly burrs.

What becomes of this burr when the fruit is ripe and ready to be eaten? It cracks open, and the nuts fall out.

How is the walnut protected? The cocoa-nut? The peach?

What is upon the outside of the apple? The skin. What is the skin for? It is a hard and tight covering, and keeps the inside of the apple from being wet or injured in any way. It is so smooth that the water flows off from it immediately.

Where do the particles out of which the skin is formed come from? They must come up from the tree, and through the stem, into the apple.

Is all the apple except the skin and the stem good to eat? What is there in the centre? The core.

How is the core formed, and what is it for? It consists of four or five little bags placed in the middle to hold the seeds.

Does the core make the apple more or less pleasant to be eaten? Would it not be better if apples grew without cores? Why not? Because then there would be no seeds, and so there could be no new apple-trees.

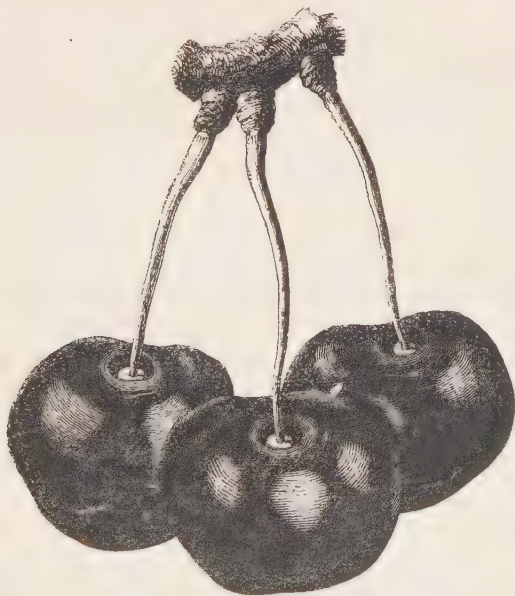
Has the orange any skin? Is it like that of the apple? What difference do you think there is between the skin of the orange and that of the apple? Which is the prettiest color? Which is the smoothest?

Has the fruit of the peach a hard or soft covering? It has a very soft one.

Has the seed a hard or soft covering? It has a hard covering. The stone is the seed.

Has the fruit of the cherry a hard or a soft covering? Has the seed a hard or a soft covering?

Here is a picture of some cherries—three in a bunch. Cherries



grow in little bunches. Each cherry grows at the end of a long stem. Do you see where the stems grow out of the branch? The ends where they grow out of the branch are rough and corrugated. Corrugated means wrinkled.

Of what use are fruits to men? Do animals like fruits? What animals like to eat cherries and plums? Birds. What

animals like to eat apples? Cows. What animals like to eat acorns? Pigs.

What use do men make of apples besides eating them? They make cider of them. How do they make the cider? They first crush the apples, and then squeeze the juice out by a press.

Is the juice of any other plant used for drink? Yes, the juice of currants and grapes. Are grapes used for any other purpose? Yes, raisins are made of them. How are the raisins made? The grapes are spread out and dried, and when they are dried they become raisins.

Are all the apples and oranges which grow gathered and eaten? No, immense numbers fall upon the ground and decay. Do these do any good? Yes, they help to nourish the seed when it sprouts and grows the next spring.

Do all fruits grow upon branches of trees and plants high in the air? No; some grow on the ground, such as watermelons and muskmelons.

VI. SEEDS.

WHAT is in the middle of an apple? The core and the seeds. Of what use are seeds? They can be planted, and they will grow up into new trees.

How did the seeds get into the apple? The substance of them came up through the stem, and is formed into seeds afterward.

What is the appearance of the outside of an apple before it is ripe? It looks hard and green. How does it look after it is ripe?

It looks mellow and rosy. What is the appearance of the outside of an apple-*seed* before the apple is ripe?

Is it the outside or the inside of the seed which sprouts and grows when it is planted? It is the inside. The outside skin bursts open, and then the inside grows out. How does it begin to grow? A small sprout shoots out, part of which runs down into the ground and becomes a root, and part springs up and grows into a tree.

How does the sprout of a walnut get through the shell? The shell cracks open by the frost and the wet.

In what are the seeds of the pea inclosed? In a pod. Did you ever pull open a pea-pod, and see all the little seeds within?

Do beans grow in a pod too?

Are the seeds of the currant in a pod or in fruit? Could you find the little seeds in a currant, do you think, if you were to break one open?

Some seeds are very small—very small indeed. Poppy-seeds are very small, and so are grass-seeds. There are some seeds so very small that, if you had one of them in your hand, you could not see it.

Some seeds are very large. The cocoa-nut is a seed, and it is very large indeed. It grows on a high tree. It has a very hard shell. Did you ever see a cocoa-nut?

There is something very curious about apples when they get ripe, and that is, that the joints of the stem weaken where they connect with the branch of the tree, so that they come off very easily. Before they are ripe they cling to the tree very tight, but when they are ripe they can be shaken off very easily. The

tall girl in the picture is shaking the tree, and the ripe apples drop off. One of the children is holding her apron to catch them as they fall, and the other two are picking them up off the ground.



The apples that are not ripe cling to the tree.

Are there any seeds in raspberries? In strawberries? In figs? Yes, there are seeds in all those things, and if you look you can find them.

Do you know of any flower whose seeds are inclosed in a pod? Yes, the pea is one; and the clover is another, though the pods of the clover are so very small that you can hardly see them.

How are the seeds of a poppy inclosed? They are in the cells of a round ball, with holes in the top to let the seeds out when they are ripe, and a cap over the top to keep the rain from getting in. It is very curious indeed.

How are the seeds of corn bestowed? They are arranged

beautifully in rows round and round the cob, which is in the centre. See how regularly they are arranged in rows! When it is growing, the corn is covered with husks, as you see in the lower ear in the picture, to keep out the wet, and also to prevent the squirrels and field-mice from eating the kernels before they get ripe.

At last, when they

get ripe, the husks open, and then the squirrels and field-mice can eat as many as they want.

At the top of the ear of corn is a little tassel of green and silky threads.

Has the rose any seeds? Yes. Is there the same number of



seeds in every plant? No, indeed; some have a great many more than others.

Do you know how many seeds there are in an apple? Would you like to count some day?

How many are there in a peach? What is the seed of the peach? How many are there in an orange? How many in a chestnut burr? Three.

Sometimes the seeds from a flower or a tree drop down upon the ground, under the flower or tree, and sprout and grow there, and sometimes they are carried away by animals and dropped in distant places, and sometimes they are scattered about by the winds.

How can the winds blow about any seeds? Some seeds have a sort of feather growing to them by which they are blown about. You can see this in the thistle and dandelion. Did you ever see a thistle-seed or a dandelion-seed flying through the air?

Are seeds of any use to animals? Yes; many animals live upon them. Many birds live upon grain, such as wheat, corn, and other seeds. Many animals, too, eat nuts and acorns, which are seeds.

Can these animals obtain nuts and acorns during all the year? No, only in the autumn.

Then what do they do for food during the winter and spring? They treasure up nuts in holes in the ground and in hollow logs, and thus always have some to eat. They gather the nuts and put them in their holes in the fall of the year.

Are seeds of any use to men? What seeds are most useful to men? The seeds of wheat, and rye, and barley, and corn, and all

the other different kinds of grain. What is made from grain? Flour and meal.

How is it made? The seeds are put into a mill, and ground fine between two large, round, flat stones.

VII. SITUATION OF PLANTS.

WHERE do plants grow? They grow in the ground.

Do they grow equally well in all kinds of ground?

Do they grow well where it is very sandy? Do they grow well where it is very rocky? Do they grow well where it is very wet? No, not generally. But some plants will grow where it is wet. Some plants will grow where it is all water. The trees, and bushes, and flags, and lilies grow up in these places directly out of the water. Such a place is called a swamp.

Will plants grow well where it is very dry? No, they will not. Suppose the ground should become *perfectly* dry, what would happen to the plants? They would all die.

What makes the ground become dry?

The sun shines upon it, and dries up the moisture. Why then does it not at length become perfectly dry, and all the plants fade away and perish? Because the rain comes from time to time and waters it.

Does the ground ever become so dry as to make the plants begin to wilt and die? How do the plants appear when they are injured for want of water? They wilt and fade, and turn brown.

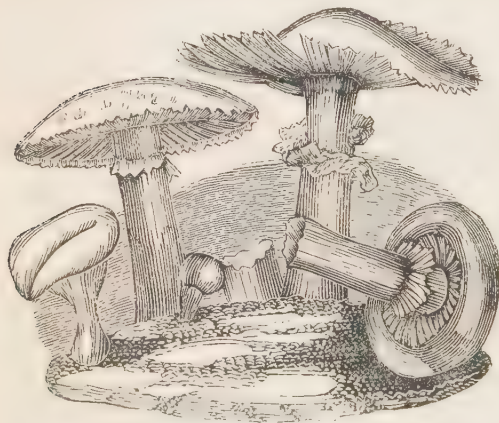
Are plants watered in any other way besides by rain? Yes.

by the dew which gathers upon them in the night. Is there any other way by which plants are watered besides by rain and dew? Yes, we can water them with a watering-pot.

Do plants grow at all times of the year? No. In what part of the year do they grow? In the spring and summer.

What becomes of plants in the winter? They cease to grow, and the leaves and fruit drop off. Do they die, or only cease to grow through the winter, and bud again in the spring? Some die, and some continue alive until spring.

Does an apple-tree die in the winter, or live from year to year? How is it with the poppy? The pink? The tulip? The lily?



There are some plants that spring up in a night, and only live a day. They are called mushrooms. Children call them toad-stools. See them! What funny-looking things they are!

There are very few plants that live so short a time as this. Almost all the flowers in the garden come up in the spring, and live through the summer, and then die when the winter comes on. There are some that live for several years.

But then, if these plants all die in the winter, where do others come from the next year? From the seeds.

Do all plants require the same soil and climate? No; some grow in very cold, snowy regions, and some in the hot countries, far toward the south, under a burning sun.

Do cold or warm countries produce the greatest variety of plants? Warm countries.

Do all plants require the same situation? No; some grow in open fields, some in forests, others in marshes or in stagnant ponds. Some live on rocky precipices, or on the summit of lofty mountains, and others, that will not live upon land, grow and thrive in the sea.

VIII. USES OF PLANTS.

ARE any plants useful to men? Yes, a great many. Are all plants useful to men?

Can you think of any which are useful?

What plants are there that are not useful? There are a great many that grow up of themselves in the gardens that are not useful. What do they call these useless plants that spring up in gardens of their own accord? Weeds.

What are some of the most useful plants that you can recollect?

What part of the plant is useful to men, the root, the stem, the leaves, the flower, the fruit, or the seed? Sometimes one, and sometimes another. In what plants is the stem useful? Can you think of any plants that are useful for the fruit? What plants are useful for the seed?

Do you know of any plants in which the juice is useful? The juice of the maple is useful to make sugar, and so is the sugar-



cane, which grows in warm climates.

Here you see some growing. There is one of the natives at work hoeing it.

The cane-plants are jointed. Don't you see the joints? The stems are full of juice, which is very sweet.

Now how do you suppose the juice is obtained in order to make sugar of? I will tell you how. The cane is first ground in a mill, and then subjected to a powerful pressure in a large

press: in this manner the juice is obtained. Then they boil it down, and so change it into sugar.

Which is useful in the potato, the root, the stem, the fruit, or the seeds? In corn? In the apple-tree? The oak? The carrot? The beet? The rose? The peach? In grass? In hemp?

See how many plants you can think of that are useful for food. How many can you think of that are useful for clothing? How many can you think of that are useful for building?

Could men live if there were no plants? No, they could not, for there would be nothing to eat.

You might think, perhaps, we could live on meat and milk. But meat is the flesh of animals, and if there were no plants, then there would be no animals, for there would be nothing for the animals to eat.

Could we have any clothing if there were no plants? No, we could not. Is all our clothing made from plants? No, some of it comes from animals.

Could we not, then, have clothing made from animals if there were no plants? Why not?

How would the fields look if there were no plants? They would be barren and desolate; all would be bare and rugged rocks, or sterile plains of sand.

DIVISION VI.

A R T.

I. CHAIRS AND TABLES.

Now I am going to teach you about the things in this room. Here are the questions; see if you can answer them.

What are some of the most useful things in this room?

What is a chair for? What is the table for?

Is a chair used for more than one person at the same time?
Is the table?

What is the mantel-piece for? What is the looking-glass for?
What is the floor for?

What are chairs made of? What are tables made of? What
is the carpet made of?

How many legs has the chair?

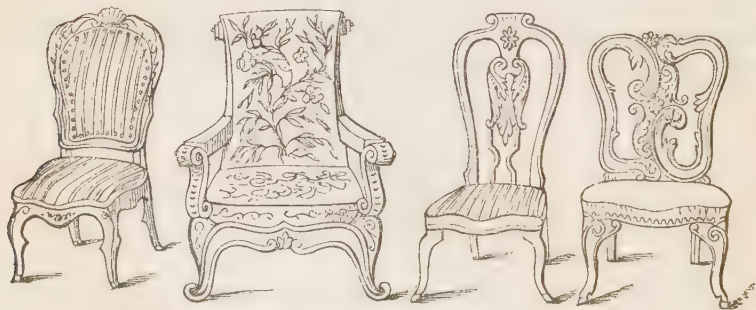
What do these legs support? The seat that we sit upon.

What is the back of the chair for?

Are the backs of all chairs made alike?

Are the seats of all chairs made alike? How do they differ?
Sometimes they are made of wood, sometimes of flags, and some-
times they are stuffed like cushions.

See how many different kinds of chairs there are in this room.



Which are the longest, the legs of a table or those of a chair?
Why are the legs of the table the longest? So as to make the
top of the table come up to a convenient height for us when we
are sitting in the chair. Do you think that if the top of the table

was as low as the seat of the chair, that it would be convenient to eat our breakfast from it?

What is the use of the cross-pieces which sometimes go from one leg to another of the chair? To strengthen the legs, and keep them steady.

Why are there not cross-pieces to go from one leg of the table to the other? Because they would be in the way of our feet in sitting at the table, and therefore the legs of the table are made large and strong of themselves.

Why can not the legs of a chair be made large and strong of themselves? Because a chair must be moved frequently, and must therefore be light. Still, they are often made without any cross-pieces.

What is a bench? What is a bench for? What do you think is the difference between a bench and a chair?

What is a stool? What is it for? What do you think is the difference between a stool and a chair?

What is the difference between a common chair and an arm-chair? What are the arms of an arm-chair for?

Is a chair made of one piece of wood? How many separate pieces of wood are there in a chair? See if you can count them.

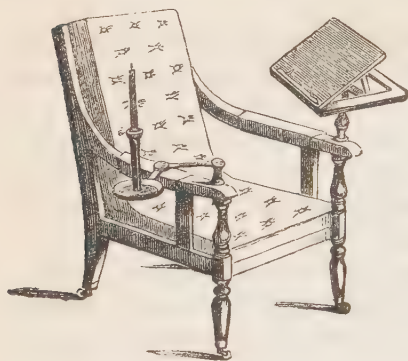
How are these pieces fastened together?

What is the color of the chair? Is all wood of this color? Is there any wood in this room of a different color? What wood?

Was the chair, when it was first made, of its present color? Generally not. Chairs are generally painted.

Is there any thing else in the room which is painted? Look around, and see if you can find any thing.

Here is a curious sort of chair. Look at it. Do you see the contrivances on the arms of it? There is a little desk to hold a book on one side, and a candlestick on the other. The candlestick is on a brass branch which can be moved in and out. Do you see the branches and the joints in them?



How many tables are there in this room? Are there any other tables in the house, do

you think? Why do we need so many tables?

Are all these tables made of the same size? Are they all of the same shape? What is the largest used for? What is the smallest used for?

Are all the tables made of the same kind of wood? Of what wood are they made?

Which do you think is the handsomest wood for a table?

Are all tables of the same height? Which is the highest, the top of the table or the top of the back of a chair?

Which do you think is the most necessary, chairs or tables? Why?

What is the leaf of a table for? It is to fold down, so that the table may be made small when it is put away, and yet be large when it is out in the room in use.

How is the leaf fastened to the body of the table? By hinges.

What are the hinges made of? How many hinges are there? Why are there so many?

What keeps the leaf of the table up when it is in use? There is a support underneath. What is done with this support when the leaf is to be put down?

What is the difference between a table and a light stand? Why is the light stand made so small?

What is a drawer? Why is it made so as to slide in and out?

Are there any drawers in any of the tables in this house? Are there any drawers in any other furniture?

What keeps a table-drawer from falling down to the floor when it is shut? There are little ledges or projections underneath it on which it slides. This is very curious. Would you like to have me open a table-drawer some day, and let you see how it is contrived?



Here, now, is a very pretty picture of people sitting round a table. What comfortable looking chairs! See! the table is just high enough for the man to rest his book upon while he is reading. The man is reading a story to his wife and children. See how attentively they are listening!

What a pretty window! The window is open, and we can see a pretty view. I think it must be a pleasant summer's day.

Who makes tables? The cabinet-maker. What else does the cabinet-maker make? He makes sofas, and desks, and book-cases, and bureaus, and all such things.

II. THE FIRE-PLACE.

WHAT is the fire-place for?

What are the sides of it called? The jambs.

Why is it always placed at one side of the room? So that the smoke may go up the chimney.

What is the fire-place and the chimney made of? Of bricks; only sometimes the front of the fire-place, that is, the part that is seen, in the room, is of marble. Why is the chimney made of bricks rather than of wood, like the rest of the room?

How far does the chimney go up? It goes up to the top of the house, and is built out there far above the roof.

Why is it built higher than the roof of the house? In order to carry the sparks high up into the air, so that they may not set the house on fire.

What is the hearth for? It is to catch the coals or the brands that fall down from the fire. What is it made of in this room? Why may it not be made of wood?

Why do the sides of the fire-place slant outward? So that the heat may come out from the fire into the room more readily.

What are the tongs for? What is the use of the round, flat pieces at the end of the legs? What is the joint for at the upper end of the legs? So that the legs may open and shut.

Why is the shovel made large and flat at the lower end? Is this part of the shovel perfectly flat? No, it is bent up at the sides. Why? So that, when we take up ashes in it, the ashes may not fall off over the sides.

Why is the handle of the shovel made so long? So that our hands may not be so near the fire as to get burned when we are using it.

What are the shovel and tongs made of? Why could they not be made of wood?

What are the upper parts generally made of? Of brass. Why? Because it looks better. Why is not the whole made of brass? Because the fire would burn the brass and spoil the bright color of it; so it is better to have the parts that go into the fire made of iron.

What do we burn in a fire-place? Sometimes we burn wood and sometimes coal. What holds the wood while it is burning in the fire-place? The andirons. What do we use to hold the coal when we burn that? A grate.

What is the particular use of the andirons? They hold the wood up out of the ashes while it is burning. Why is it necessary to keep the wood up from the ashes? So that the air can get to it and make it burn.

What is the use of the front part of the andiron, which reaches up so high? To keep the wood from falling out upon the floor.

How many legs are there at the front part of the andiron? How many at the back part? Why are there more at the front part? Because that part is more exposed, as it stands out toward the room, and it must therefore have more legs to make it stand firm.

Could we build a fire at all without andirons? Yes.

How do you know? Have you ever seen a fire without andirons?

Could we build a fire *as well* without andirons? No, not so well, and it would require more wood to make it burn.

Are the andirons made wholly of one substance? Of what are they made?

Do you know how they are made?

Why do they not use andirons for coal as well as for wood? Because the coal is in small pieces, and so it would not lie across the andirons. What is the use of the bars of a grate? The spaces between the bars let the air in, and that makes the fire burn.

What is the hearth-brush for? What is it made of? The brushing part is made of bristles.

What good do the bristles do? They brush all the little things upon the floor or the hearth along before them, and so sweep the place clean.

From what animal did the bristles come? From a pig. Would the hair of any other animal answer as well? Why not? It would not be stiff enough. Did you ever see a pig? Did you notice how rough and shaggy his stiff bristles make him? Which has the prettiest hair, the pig or the cat? Which is the most useful, the cat's hair or the pig's hair?

What is the handle of the brush for? Why is it so slender? So that it may be light and easily moved.

What is the use of the large wooden part between the handle and the bristles? The bristles are fastened into it; they could not be fastened into the end of the handle. Why could they not

be fastened into the end of the handle? Because it is not large enough.

How are the bristles fastened in? They are first rolled up in little bundles, and then glued in. Is the brush painted?

What are the bellows for? How do they make the fire burn? By making the air go to it faster.

What is the hole in the wooden side of the bellows for? To let the air in.

Are the bellows made wholly of wood? How many pieces of wood are there? How are these connected together? Why is this part made of leather? So that the top and bottom can be pulled apart to draw in the air.

What are the handles for? To move the sides of the bellows by.

What makes the air go out through the nose to the fire? We press the top and bottom of the bellows together again, and the air is forced out. Why does it not go out the hole in the side where it came in? There is a little clapper there, which shuts down and stops up the hole.

Why do the sides of the bellows slope off toward the nose? So as to guide the air to it.

Why is the nose made so long and straight? So as to guide the air well toward the fire.

Why is it made of iron or brass? Because this part comes very near the fire, and iron or brass will not burn.

How are the leather sides fastened to the top and bottom of the bellows? With nails. Why are the nails so thick? So that the air may not escape.

If we turn the bellows upside down, and try to blow the fire with it, can we do it?

Why not? The reason is because the clapper hangs down so as not to stop up the hole in the side, and so almost all the air comes up through it, when we try to blow, instead of going through the nose to the fire.



you see in the room?

Which do you think is prettiest, a wood fire on andirons or a coal fire in a grate? Here is a picture of a coal fire, with a lady sitting before it to warm herself. What is the lady doing? What is she sitting in?

Do you see the grate, and the coal in it, and the fire burning? Do you see the mantel-shelf, and all the things on it? Do you see the table? What is there upon the table? What else do

III. WINDOWS AND DOORS.

WHAT are windows for? Point to a pane of glass.

Is the whole window made of glass? Point to the part which is not made of glass. What is that part made of? What is it called? It is called the sash. What is the sash for? The

panes of glass are fastened to it. How are they fastened to it? By a substance called putty, which is placed upon the outside.

Why was not the window made of one large piece of glass instead of so many smaller pieces? Because it is very difficult for the glass-makers to make such large pieces.

Is there any other reason? Yes; if the glass were in one large piece, and any thing should be thrown against it, it would break the whole window, but now it only breaks one pane.

How do we open the window? We slide up the lower sash into the upper part of the window. How many sashes are there in a window? Two. Which is placed farther back, the upper or the lower one? Why? So that the lower one may slide up when we wish to open the window.

Why is glass used in the window? Because it is transparent; that is, the light will shine through it.

The light would come in if there was only an open place; why is it necessary to have glass? Because, if it was open, the rain and the wind would come in.

What is the door for? What is it made of?

Why does it come down so much lower than the windows? Because we wish to walk out.

Why might not the window be made to come down as low as the door? Because it would be more liable to be broken. Still, sometimes windows are made to come down to the floor.

Is the door fastened to the wall on both sides? No, only on one side. What is it fastened with? Can you see the hinges? What is the use of the hinges? The door can swing by means of them, so as to open and shut.

Why is not the window made to open and shut on hinges, so as to swing out into the room like a door? Because, if it were to open on hinges, when it was open it would be in the way. Besides, there would be danger of its being broken by being blown to by the wind.

Why is not a door made to slide up like a window, so as to be out of the way? It is so high that there would not be room for it to slide up so that a person could walk under it; and, besides, it is so large and heavy it would not be easy to raise it.

IV. THE HOUSE.

WHAT is the floor of the room made of? It is made of boards. Is the floor ever covered? With what? Are floors always covered with carpets? Think of any floor which is. Think of any which is not. Why are floors covered with carpets?

Are the sides of rooms made of wood? Is any part made of wood? Which part, the upper or lower? Why is the lower part made of wood? So that when the floor is washed the plastering may not get wet.

What is that part of the sides of the room made of which is above the wood? It is plastering. How is plastering fastened? It sticks to the boards or to the bricks which the house is built of.

How was it put on? It was put on when it was wet and soft, and it has dried and hardened since.

What is the plastering for? To make the walls smooth and tight, so as to keep out the cold air.

the pigs may be sheltered from the rain, and have a warm place to sleep in at night.

What do you suppose the pigs have for a bed to sleep upon? They have straw. Don't you see the straw all over the floor of the pen?

Do you know what the reason is that people almost always keep pigs shut up in pens, instead of letting them go out in the fields like the horses and oxen? The reason is because they do not eat grass like the horses and oxen, but, on the other hand, they would do mischief if they were let out into the fields. They would root up the ground, and make holes in it all about. Pigs like roots, and so they dig down into the ground with their snouts to search for roots, and that tears up the ground and spoils the beauty of the turf. In order to prevent this, they have to be kept shut up in pens all the time.

If pigs had more sense they would not act in that manner. Good children, that have sense, are careful, when they go out into the fields and gardens, not to do any mischief. They do not break down the trees or flowers, or trample on the beds, or do any other mischief whatever, and thus they are allowed to ramble about wherever they please; but pigs, not having sense enough to keep out of mischief, must be kept shut up.

There are some children that have not sense enough to walk carefully when they go into a garden, and to take care not to trample upon the flowers. All such children should be shut out of gardens, and not allowed to go into them at all.

Horses and cows don't generally do any mischief in the fields. They never dig up the ground. The horse prances about some-

digging a large square hole in the ground, and then building the house over it.

What are the sides of the cellar made of? Of bricks or stones. Why are the sides walled up with bricks or stones? So as to keep the ground from falling in.

Is the cellar a pleasant or unpleasant place? What is the use of such a dark, damp place? What things are kept in it in summer?

What things are kept in it in winter?

Is it ever very hot in the cellar? Is it ever very cold?

Why is it that the cellar never becomes very hot or very cold? Because it is so low in the ground that the heat and cold do not get into it.

How do we get from the parlors of a house to the chambers? Why are stairs made rather than a regular slope? Because, if there was only a slope, we could not go up, and if we were at the top, we should slide down to the bottom.

In going up a hill in the road, do we ascend by steps or by a slope? Why might we not ascend by a slope in the house as well as in the road? Because it would be very much more steep than any road.

What are the banisters on a stair-case for?

On the opposite page is another picture of a house. How many rows of windows do you see in it besides those in the roof? Do you see the chimneys? There is a chimney at each end. Do you see the smoke coming out of one of the chimneys? This smoke comes from the fire-places down in the rooms of the house.

What do we mean when we say that a house is two stories



high? We mean that it has two tiers of rooms, one above another, and two rows of windows. How many stories high is the house in the picture?

How many stories high is the house you live in?

What are chimneys built of? Of bricks. Are chimneys ever built of wood? Why not?

Do not chimneys which are built of brick ever take fire? They are sometimes said to take fire, but it is only the soot which has collected inside of them which burns. Where does the soot come from? It comes from the smoke.

Suppose there should be three rows of windows, one above the other, how many sets of rooms would there be? How many stories high would the house be? Has the word stories any other meaning? What meaning?

What is the roof of a house for? It is to cover the house

above, and keep off the rain and snow. What is the shape of the roof of a house? It slopes.

Why are roofs made to slope? So that the rain can run off easily.

Are the roofs of houses in any countries made flat? Yes, in some warm countries. Why can the roofs of houses in those countries be made flat without injury? Because there is but little rain there.

What are roofs of houses in this country generally covered with? They are generally covered with shingles or slates, and sometimes with sheets of tin or of iron. What is the use of slates or shingles? To make the water run off better. How do they make the water run off better? They are arranged in rows, and those in one row lie over those in the next, and thus the water runs from one to the other.

Why might not the roof be covered with boards only? The water would run through the cracks between the boards down into the house? Why does not the water run through the cracks between two shingles? It does; but that which goes through in the crack between any two shingles of one row comes upon the middle of a shingle in the next row, and then runs off.

Do you remember what is the name of that part of the house which is immediately under the roof? It is called the attic if it is finished into rooms.

Suppose it is not finished, what is it called then? The garret. What is the garret used for?

Is the whole of a house covered with one roof? No, not always. Sometimes the house consists of a great many different

buildings, and there is a separate roof over each one. Here you see a house with a great many roofs, and three tall chimneys



rising out of them. When a rain-storm comes, the rain falls upon all these roofs, and runs down the slopes, and so goes away, and all the rooms in the house, and all the furniture in them, and the people, are kept dry.

Do you see these three little birds in the picture? They are hopping about on the ground. One of them is flying. These are three young birds. They are just learning to fly.

Don't you see the trees in the picture near where the birds are? The nest of the little birds is in one of those trees.

DIVISION VII.

TRAVELING.

I. ON THE LAND.

PEOPLE travel on the land in many different ways. Sometimes they ride on horseback, sometimes they go in a carriage of their own. Sometimes they go in the public stage, and sometimes in the cars on the rail-road.



Here is a picture of a man on horseback. Which should you think would be the easiest, to travel on horseback or in a carriage? It is much easier to go in a carriage: for in a carriage you are

drawn along smoothly over the ground, but the horse trots you up and down by a sort of jolting motion.

In the picture the man has stopped. He has stopped to look at the prospect. Don't you see what a beautiful prospect there is where his horse is standing?

Do you think a person can see the country best when he is riding on horseback or when he is in a carriage? I think he can see much better when he is on horseback, because then he can look about in every direction. He can see the sky over his head, and the ground beneath his feet, and the hills and valleys, and the road, and all the country. When we are in a carriage, if the curtains are up, we can see pretty well, but not so well as when we are on horseback.

Here is another picture of a man traveling on horseback. He has stopped by the road-side. Do you see what he has stopped

for? It is to give his horse some drink. The boy is holding up a pail to the horse's mouth. What do you suppose is in the pail? Where do you think the boy got the water? See! the man is putting his hand in his pocket. I suppose he is going to



reward the boy for his kindness. Don't you?

What is placed on the back of the horse for the man to sit

upon when he is riding? A saddle. What is there on the horse behind the man in the picture? A cloak rolled up, and a pair of saddle-bags. Do you think that a man can have a trunk to carry his clothes in when he is riding on horseback?

Sometimes, when people have no horse to ride, and no money to pay for going in the stage or in the cars, they have to walk. How do you suppose they carry their clothes in that case? Do you think they can carry a trunk? Do you think they can carry a pair of saddle-bags? No; they have to carry their clothes in a bundle. Here is a young man who is making a journey on

foot. He is tired, and he has stopped to sit down by the road-side to rest. Do you see his cane? Do you see his bundle of clothes?

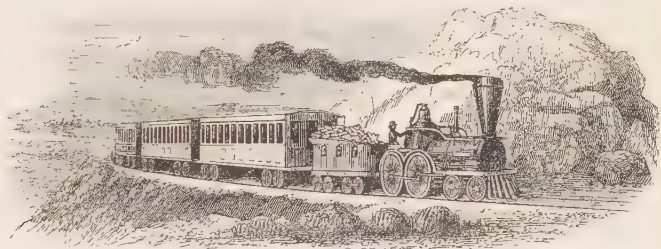
Don't you think that he has stopped in a very pleasant place? See! there is a pretty waterfall behind him,

and a wood. I suppose that his road goes through that wood.

It is very pleasant traveling on foot in a pretty country if the road is good and the weather is fine. But do you think that a traveler can go very fast in this way? No, he can not go fast. He can only go very slowly. If you wish to go fast you must go in the cars. The train is coming. If you wish to see it, look on the next page.



Here it comes. Do you see the long train of smoke coming out from the chimney?



What comes first in the train? The locomotive. What is a locomotive? It is a steam-engine on wheels. There is a fire in the locomotive, and a boiler, and the fire makes the water boil, and that makes the steam form, and the steam pushes, now this way and now that, within the machinery, and the machinery makes the wheels go round, and the wheels make the locomotive go forward, and the locomotive draws all the cars after it swiftly along the rails.

What comes next to the locomotive in the train? The next thing to the locomotive in the train is the tender. Look at the picture and see it.

What is the tender? It is a sort of car that comes after the locomotive with wood and water. Why is it called the tender? Because it attends the locomotive. It follows close behind the locomotive to supply it with wood and water.

Where does the tender carry its wood? It carries its wood in the middle, and heaped up to the top. Look at the picture, and

tell me if you don't see the wood in the middle of the tender, and all piled up at the top.

What is the wood in the tender for? It is to put on the fire in the locomotive, so as to keep the water boiling all the time.

Where do they keep the water in the tender? They keep it in the sides. But how can they keep water in the sides? The sides of the tender are double, with a space between, and this space is filled with water. Why does not the water leak out? Because the sides of the tender are made of copper, and the doubling is made of copper too, and all the joints are riveted very tight and strong.

What is the water in the tender for? It is to be put into the boiler in the locomotive, to be boiled there into steam to make the locomotive go.

Did you see three little buckets hanging by the side of the tender in the picture? Let us turn back and look. What do you think those buckets are for? Do you suppose that they are to dip the water out of the tender with, and pour it into the boiler? No, indeed, they are not for that. The men could not put the water into the boiler in that way. The water is pushed into the boiler from the tender through a little pipe. How is it pushed through? It is pushed through by a sort of pump. The buckets are to put the fire out in case the sparks from the locomotive were to set the wood or the cars on fire.

What comes next after the tender? Next come the cars of the train with all the passengers. The cars are mounted on wheels. What are the wheels for? To make the cars run easier. What are the rails for? They are to make a hard, and smooth, and

level track for the wheels to run upon. Why are they made of iron? So as to be strong. If they were made of wood, they would soon be worn out and broken to pieces by the wheels rolling over them.

Where do the passengers sit? They sit in the passenger-cars. They have pleasant seats there, where they can sit and look out of the windows as they are trundled swiftly along the road.

II. ON THE WATER.

WHICH do you think is the pleasantest, to travel upon the land or on the water? Here is a steam-boat just going off, and a train



of cars just come in. The passengers that came in the cars have got into the steam-boat, and are now just beginning to sail away. The steam-boat has a steam-engine in it, just like a locomotive, with a fire, and a boiler, and wheels, and machin-

cry; only the wheels of the steam-boat turn round in the water instead of rolling on the rails.

How many chimneys are there to the locomotive? How many are there to the steam-boat? Do you see all the people walking about on the deck of the steam-boat as she sails along?

Here is a picture of a large steam-boat sailing on a river. It is loaded with bales of cotton. Do you see the ends of the bales

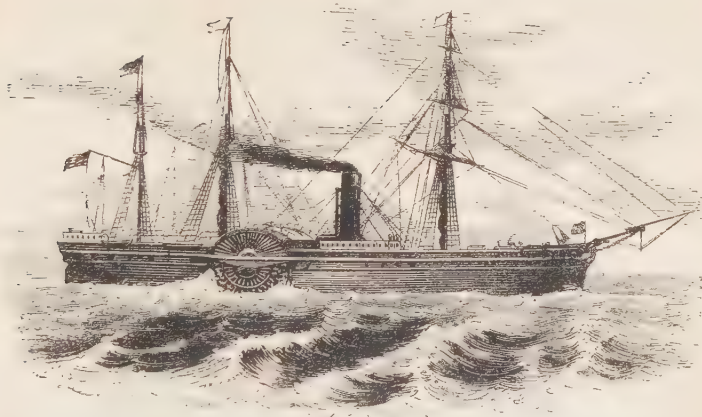


of cotton all piled up? Do you see the windows in the side? These windows open into the little rooms in the steam-boat where the people sleep at night. Do you see all the people walking about on the top of the steam-boat?

This is a river steam-boat, that goes where the water is smooth, and there are no great waves to dash against the boat, and so they can have it built up high, with a great many windows, and places for people to walk. But steamers that go to sea sometimes get among great waves that dash all over them, and so they must not be built up so high, with places for windows, and for people to walk. Here on the next page we see



how the sea-steamers look sailing over the sea.



Do you see the smoke-pipe? Do you see the paddle-wheel? Do you see the masts? Do you see that there are no high places built up, with large windows, and places for people to walk? If there were such things built up, they might be washed away by the waves.

Do you see some boats hanging by the side of the steam-ship? Do you know what those boats are for? They are for the people to get to the land in, in case the steam-ship should be wrecked.

What are the masts for? They are to fasten the sails to. And what are sails for? They are to spread out to the wind, when the wind is fair, in order that the ship may be blown along. But why do you think they need sails for a steam-ship, since she has an engine and paddle-wheels to move her along? It is because the engine sometimes gets out of order: and then, besides, even if the

engine is in good order, and the paddle-wheels are going, the men can often spread the sails too, and so let the wind help.

Here is a beautiful picture of a ship going by sails alone. This



is not a steam-ship at all; it is a sailing ship. Do you see all the sails? Do you see how they are all filled out by the wind that is blowing the ship along?

How many masts are there? There are three. Two of them have flags flying at the top of them. Do you see all the ropes? What are the ropes for? Some of them are to keep the masts steady in their places, so that they may not be blown over by the wind; others are to hoist the sails by, and to let them down again.

Beyond the ship, we can see the land at a distance, and other ships and sail-boats going toward it

Here is another picture of a ship, only this one is coming directly toward us. Do you see all the sails? How many sails are there? There are almost too many to count. Perhaps you can count them if you count very carefully.



This ship goes very swiftly through the water. The reason is, there are so many sails up, and the wind blows so fresh. Do you see how she dashes up the spray as she drives along?

Do you see the birds flying about over the water? Those birds are gulls.

Sometimes, in a storm, the ship gets dashed upon a rock and wrecked.

Here is a picture of a ship dashed upon the rocks and wrecked.



Do you see the rocks? Do you see the ship driven against them,

and the masts all broken to pieces? Where are all the sails now? They have been torn to pieces by the wind and blown away. What do you think has become of the poor sailors? I am afraid they are all drowned. Perhaps they have gone to the shore in boats, but I can not see any boats any where in the picture. Can you? Ah! here they are, going away in the boat.



they will succeed in getting to the land, and that they will find some people there who will receive them kindly and take good care of them.

Do you see the ship dashed upon the rocks, and the masts all broken? Do you see the boat and all the people that are in it sailing away? There are some women and children in the boat. They were the passengers, I suppose. I am sure I hope

THE END.



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